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PHARMACOPŒIAS, Dublin, B.C.P.

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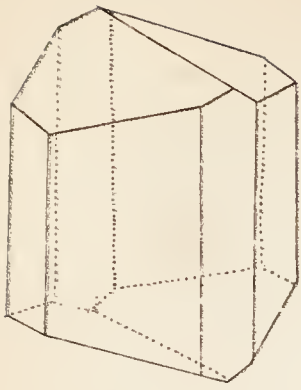


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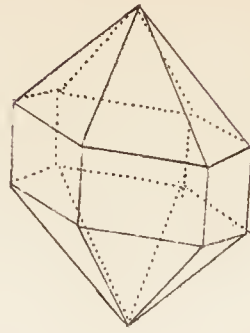
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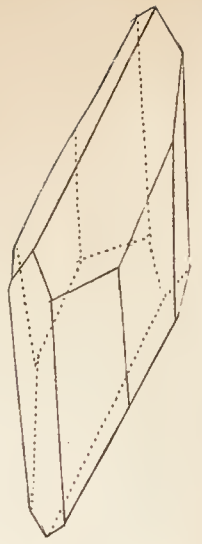
FORMS OF SALINE CRYSTALS.



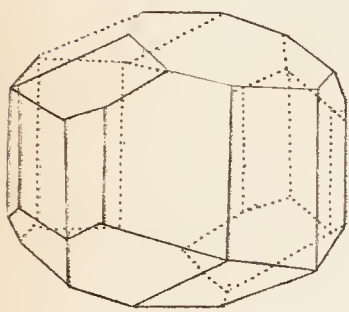
Bicarbonate of Potash.



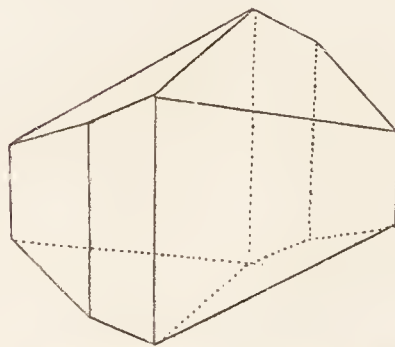
Sulphate of Potash.



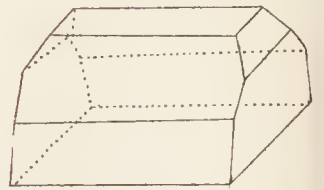
Carbonate of Soda.



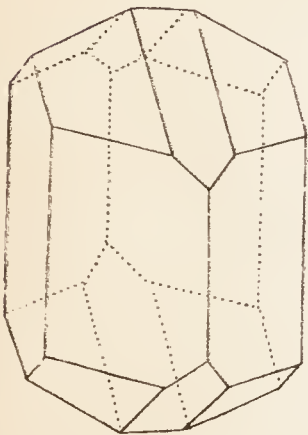
Sulphate of Soda.



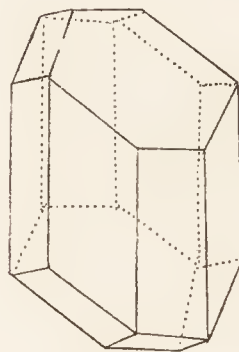
Tartrate of Potash.



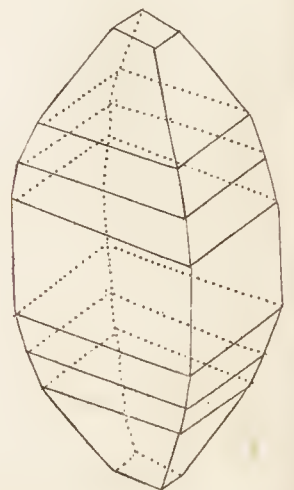
*Tart. of Soda and Potash
modified form of.*



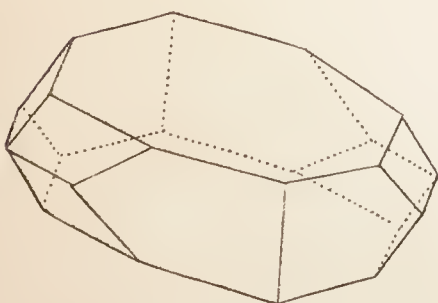
Sulphate of Magnesia.



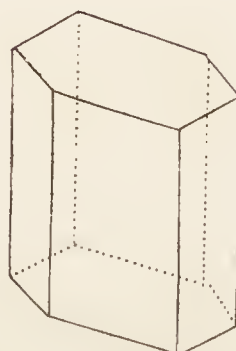
Phosphate of Soda.



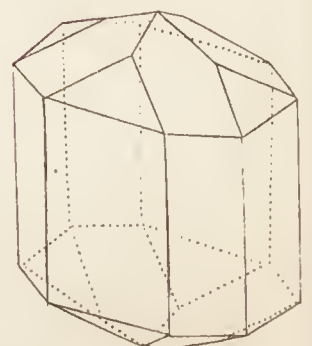
Emetic Tartar.



Nitrate of Silver.



Bichloride of Mercury.



Sulphate of Zinc.

OBSERVATIONS,
CHEMICAL AND PRACTICAL,
ON THE
DUBLIN PHARMACOPŒIA:
WITH
A TRANSLATION ANNEXED.

By F. BARKER, M. D.,

PROFESSOR OF CHEMISTRY IN TRINITY COLLEGE, DUBLIN; HONORARY FELLOW
OF THE KING AND QUEEN'S COLLEGE OF PHYSICIANS, ETC.

AND

WM. F. MONTGOMERY, A. M., M. B.,

PROFESSOR OF MIDWIFERY IN THE KING AND QUEEN'S COLLEGE OF PHYSICIANS IN IRELAND, AND MEMBER OF THE ROYAL IRISH ACADEMY, ETC.

DUBLIN:

PRINTED FOR HODGES AND SMITH,
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1830.



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TO

R. PERCEVAL, M. D.

FORMERLY PROFESSOR OF CHEMISTRY IN

TRINITY COLLEGE, DUBLIN,

TO WHOM THE MEDICAL PUBLIC OF THIS COUNTRY

WAS FIRST INDEBTED

FOR A PHARMACOPŒIA,

AND WHO CAN FULLY APPRECIATE THE DIFFICULTIES

CONNECTED WITH ANY WORK OF THIS KIND,

THE FOLLOWING PAGES ARE INSCRIBED

BY HIS SINCERE FRIEND

AND VERY HUMBLE SERVANT,

THE AUTHOR.

DEDICATION OF PART II.

TO THE

REV. CHARLES WILLIAM WALL,
D. D., S.F. T. C. D.

DEAR SIR,

IN choosing the person to whom I would dedicate this book, my object was to select one whom multiplied kindnesses had proved my most faithful and disinterested friend, while at the same time his high reputation for learning, piety, and the exercise of the most captivating of the moral virtues, should adorn my efforts by his sanction: while I feel how happily I have succeeded in my choice, I have the additional satisfaction of knowing that all good men, except yourself, will be ready to congratulate me on the selection.

Believe me, my dear Sir,

To remain,

With unaltered feelings of

The sincerest attachment,

Your former Pupil,

WM. F. MONTGOMERY.

P R E F A C E

TO PART THE FIRST.

THE rapid progress of Chemistry during the time which had elapsed from the publication of a Pharmacopœia in Dublin, induced the College of Physicians to revise their work, and publish a new edition.

A committee was accordingly appointed, of which the Author of the following pages was a member. On him devolved the task of arranging the materials, and making the requisite experiments for the Pharmacopœia, and particularly for that portion of it which contains the Acids, Alkalies, Earths, Alkaline and Earthy Salts, Sulphureous and Metallic Preparations: a few experimental investigations were also entered into for the subsequent parts of that work.

In the performance of this undertaking, the processes, with scarcely an exception, were repeated, in numerous instances frequently, and with many variations, the results being carefully noted down. Reference was also had to the late Dr. Wollaston's scale of chemical equivalents and to the more correct tables of atomic weights, as published by Dr. Thomson, Mr. Brande, and other chemists. It sometimes happened that ex-

periment appeared at variance with these tables; and in a few instances the process of the Pharmacopœia was made conformable to what appeared the result of experience; this is adverted to in the following work.

British and foreign Pharmacopœias and Dispensatories were also consulted with a view to the adoption of such improvements as these works might suggest. Accordingly it will, as I believe, be found that the products of processes directed in the Dublin Pharmacopœia of 1826, are with few exceptions, obtained either of greater purity, or at less cost, than those of former Pharmacopœias.

In the volume here published, the order of remarks is in almost every instance the following :

1. A translation of the mode of preparation as prescribed in the Pharmacopœia of 1826; adhering as closely as possible to the original.

2. An explanation of the process, conformably with modern chemical principles. In this part of the work, a comparison is frequently instituted between the forms of preparation as directed in different Pharmacopœias; and reasons assigned for the preference given to that adopted in the Dublin Pharmacopœia of 1826; a distinct view is also presented of the atomic constitution of Materials and Products, together with the correspondence which should exist, as to excess or equality, between each set of ingredients.

3. The chemical properties of the product are then given, and the means of ascertaining by pro-

per re-agents its purity and fitness for medical use.

4. Its applications in preparing other Medicines are detailed, with reference to the Dublin Pharmacopœia of 1826.

5. The medical properties of the product are subjoined, with practical remarks, some of them by the author ; those cautions which should be observed in its applications as a medicine being occasionally added.

Lastly, the Doses, according to various medical intentions, are annexed.

A table of the Atomic Weights of the principal simple substances is prefixed to the work : the numbers are adopted either from Dr. Thomson's first Principles of Chemistry, or from the tables of equivalent numbers by Mr. Brande.

A plate, exhibiting figures of the principal saline crystals, is given at the commencement of the work, to aid the chemical operator or student in their discrimination. These figures are extracted from papers on this subject published by Mr. Brooke in the Annals of Philosophy, vols. 5, 6, 7, new series ; to which the reader is referred for a detailed description of the forms.

To the alterations in nomenclature adopted in the Pharmacopœia, a few additions are made in the present work : thus the prefixes of *super* and *sub* are in almost every instance rejected, and those of *bi* and *di* substituted, as expressing more precisely the relative combining quantities ; the

prefix of *bi* signifying the double proportion of acid, *di* that of base.

From reference to this work, the author indulges the hope that several advantages may arise : to the student by explaining the mode of preparation of chemical agents, which, from their invariable composition, may be expected to afford uniform results when used in medicine ; and to the chemical operator, by facilitating manipulation, and economizing time, labour, and expense.

The medical prescriber also, by consulting these pages, may become acquainted with exact modes of discriminating the agents which he employs, or of detecting their sophistication ; he may at the same time refresh his memory as to their uses in medicine, and receive occasional hints for their application.

The observations on this Pharmacopœia will be continued in a second part by Dr. Montgomery, whose known accuracy, and medical information, insure the judicious performance of this undertaking.

F. B.

Dublin, 19th Nov. 1829.

TRANSLATION
OF THE
PREFACE
TO THE
DUBLIN PHARMACOPŒIA OF 1826.

IN this edition we have somewhat departed from the arrangement of the former Pharmacopœia, endeavouring to bring out a work adapted to the present state of Chemistry.

A few medicines which have either received the sanction of experience, or are now prepared with more exactness than formerly, have been introduced; a few also, being little used, are laid aside. We have changed the proportions to be observed in the quantities of substances made use of in preparing certain compounds, supported in our adoption of these alterations, by many experiments instituted by ourselves, and by late discoveries respecting the *atomic* composition of bodies.

Many names sanctioned by usage we have retained, either consulting brevity or avoiding the hazard of error in the prescription or composition of medicines.

The weights and measures heretofore directed in Pharmacopœias we have not ventured to alter, but have pointed out the proportion which our measures bear to the standard legally established by the statute of the 5th Geo. IV.

The names of plants are taken from Willdenow's edition of the *Species Plantarum* by Linnæus, with the exception of plants on more recent authority referred to a different genus or species: in this case the name of the author is subjoined to that of the plant.

We have not hesitated to adopt from foreign Pharmacopœias some medicines which have received the sanction of medical suffrage, and to these works we have endeavoured, as much as possible, to conform. A few simple and compound preparations recently discovered, or not properly belonging to the preceding divisions, will be found at the end of the work, in the section of Miscellaneous Preparations.

The pound which we employ in the composition of medicines, in English named *Troy pound*, contains 5760 grains, and is divided in the following manner:

The Pound into twelve Ounces.

Ounce eight Drachms.

Drachm..... three Scruples.

Scruple twenty Grains.

The weight of the cubic inch of distilled wa-

ter is equal to 252.458 of the above mentioned grains at the temperature of 62° ; or 252.5 very nearly at the temperature of 60° .

The standard of liquid measure is the Gallon, containing 231 cubic inches.

The Gallon, contains eight Pints.

Pint, *by measure*, sixteen Ounces.

Ounces, *by measure*, eight Drachms.

Drachm, *by measure*, three Scruples.

The Gallon contains of distilled water at the temperature of 60° Grains 58327.5

The Pint, *by measure*, 7291 very nearly.

Ounce, *by measure*, 455.6

Drachm, *by measure*, 57

Scruple, *by measure*, 19

Grain, *by measure*, 1

Any of these measures bears to the new measure of the same denomination, as regulated by the statute of the 5th Geo. IV. the ratio of 5:6; and by the addition of a fifth part, the quantity of fluid in any of these measures may be increased to the quantity of the new measure of the same denomination.*

As different preparations require different degrees of heat, we measure these, so far as can be done, with Fahrenheit's thermometer; and when we direct the application of a *superior* heat we intend to express some degree between 200 and 212;

* It is also evident that any of the new imperial measures may be reduced to the wine measure of the same denomination, by subtracting 1-6th part of the number of grains contained in the imperial measure.

when a *Medium* heat, between 100 and 200 ; when an *Inferior* heat, a degree between 90 and 100.

In the process of digestion, an inferior heat is to be applied, unless it should be otherwise directed ; in the process of maceration we desire to be understood that a heat should be applied from 60° to 90°.

Whenever mention occurs of the specific gravity of any body, we understand its temperature to be at 60°.

Wheresoever the term *Libra* occurs as applied to liquids, it is to be understood as a pint *by measure*.*

We here direct, that mortars, measures, funnels, and vessels for evaporation, shall be composed either of glass, or of some material which does not contain the least quantity of copper or lead.

REMARKS BY THE TRANSLATOR. According to the statute, 5th Geo. IV. chap. 74, no alteration is made in the standard of the Troy pound, as adopted in the year 1758, and now in the custody of the Clerk of the House of Commons, which is declared to be the original and genuine standard of weight. Weights adjusted conformably to this standard, with their proper subdivisions, are directed by the College of Physicians to be used in the preparation or composition of medicines. In the edition of this Pharmacopœia published in 1807, the cubic inch of dis-

* The same word *Libra*, in the original, is used to express both the pound and the pint *by measure*, but the pint by measure of water contains considerably more than the pound by weight of that fluid in the proportion of 7291 : 5760.

tilled water was stated to contain 253 grains, at the temperature of 60° ; but the commissioners appointed by His Majesty to inquire into the subjects of weights and measures, ascertained that the cubic inch of water, at the temperature of 62° , the barometer being at 30 inches, weighs 252.458 grains. Now, according to Mr. Gilpin's tables, as given in the Transactions of the Royal Society, vol. 84, the specific gravity of water at 62° , is to its specific gravity at 60° as 0.99981 to 1.00000, consequently the cubic inch of water becomes 252.505 grains, or very nearly $252\frac{1}{2}$ grs. at the temperature of 60° .

The following table shows the contents, in grains Troy of water, of the measures directed by the College of Physicians; and their several relations to the new Imperial measures. Column I. contains the number of grains Troy of distilled water in each of the measures of the Dublin Pharmacopœia of 1826: Column II. the number of grains in those of the Dublin Pharmacopœia of 1807: and Column III. the number of grains Troy of distilled water in the Imperial measures enjoined by the 5th Geo. IV.

I. Pharmacopœia of 1826, con- tents in grains Troy of distilled water.	II. Ditto of 1807.	III. Imperial Measure of 5th Geo. IV.
Grains Troy.	Grains Troy.	Grains Troy.
GALLON, .. 58327.5	58443	70000
QUART, .. 14581.8	14610.7	17500
PINT, .. 7290.9	7305.3	8750
OUNCE, .. 455.6	456.5	546.8
DRACHM, .. 57q.p.	57 q. p.	68.3
SCRUPLE, ... 19	19	22.8
GRAIN MEASURE, 1		

Any of these measures may be constructed, by providing a narrow glass vessel, and with the aid of a correct beam and weights, introducing the quantity of water, in grains, which the required measure should contain, carefully marking with a diamond or file on the side of the vessel, the height at which the fluid stands.

ATOMIC WEIGHTS

OF THE SIMPLE SUBSTANCES REFERRED TO IN THE FOLLOWING
PAGES :

<i>Simple Substances.</i>				<i>Atomic Weights.</i>
Hydrogen	..	..	..	1
Carbon	..	..	..	6
Oxygen	..	..	..	8
Aluminum		..	..	10
Phosphorus		..	..	12
Magnesium		..	..	12
Nitrogen	..	..	..	14
Sulphur	..	..	..	16
Calcium	..	..	..	20
Sodium	..	..	..	24
Iron	..	..	..	28
Manganese		..	..	28
Copper	..	..	..	64
Zinc	..	..	..	34
Chlorine	..	..	..	36
Arsenic	..	..	..	38
Potassium		..	..	40
Antimony		..	..	44
Tin	..	..	..	58
Barium	..	..	..	70
Bismuth	..	..	..	72
Lead	..	..	..	104
Silver	110
Iodine	124
Gold	200
Mercury	200

ORDER OF THE SECTIONS

IN PART I.

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V.—Earthy Salts, - -	164
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VII.—Metallic ditto, -	200

ERRATA.

- Page 46, *after line 7, insert, The specific gravity of this Acid should be 1490.*
—— 63, line 21, *for comes read come.*
—— 98, line 2, *from bottom of page, for doses read dose.*
—— 141, line 12, *instead of which is obtained, read and a salt is obtained.*
—— 311, line 4, *for surface read furnace.*

TO THE BINDER.

The plate of the Crystalline forms of Salts is to face the Title-page.

MATERIA MEDICA.

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Acacia arabica et A. vera. <i>Gummi.</i>	Gum arabic tree. <i>The Gum.</i>
Acacia Catechu. <i>Extractum</i> <i>ex ligno.</i>	Catechu. <i>The extract obtained</i> <i>from the wood.</i>
Acetum Vini.	Wine vinegar.
Acidum sulphuricum venale. <i>Hujus pondus specifi-</i> <i>cum est ad pondus aquæ</i> <i>distillatæ ut 1850 ad</i> <i>1000.</i>	Commercial sulphuric acid, or oil of vitriol. <i>The spec.</i> <i>grav. of this is to the</i> <i>spec. grav. of distilled</i> <i>water as 1850 to 1000.</i>
Aconitum paniculatum. <i>Folia.</i>	Monk's hood. <i>The leaves.</i>
DE CANDOLLE.	
Adeps ovillus. <i>Ex Ove Ariete.</i>	Mutton suet.
Adeps suillus. <i>Ex Sue Scrofæ.</i>	Hog's lard.
Allium Cepa. <i>Bulbus.</i>	Onion. <i>The bulb.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Allium sativum. <i>Bulbus.</i>	Garlic. <i>The bulb.</i>
Aloe hepatica. Ex A. Vulgari. DE CANDOLLE.	Hepatic aloes. <i>Obtained from the Aloe Vulgaris of DE CANDOLLE.</i>
Aloe Socotorina. Ex A. spicata. PERSEON.	Socotorine Aloes. <i>Obtained from the Aloe spicata of PERSEON.</i>
Althaea officinalis. <i>Folia et Radix.</i>	Marsh mallow. <i>The leaves and root.</i>
Alumen. Aluminæ et Potassæ Sulphas.	Alum. <i>Sulphate of Alumine and Potash.</i>
Ammonia Murias.	Muriate of Ammonia. <i>Sal Ammoniac of commerce.</i>
Amomum Cardamomum. <i>Semina.</i>	Cardamom seeds.
Amomum Zingiber. <i>Radix.</i>	Ginger root.
Ammoniacum Gummi. <i>Vide Heracleum.</i>	See Heracleum.
Amygdalæ amaræ. } <i>Amygdali communis nuclei.</i>	Bitter almonds. } <i>The kernels of the amygdalus communis.</i>
Amygdalæ dulces. }	Sweet almonds. }
Amygdalus Persica. <i>Folia.</i>	Common Peach. <i>The Leaves.</i>
Amyris Elemifera. <i>Resina.</i>	Elemi. <i>The Resin.</i>
Anethum Foeniculum. <i>Semina.</i>	Common Fennel <i>Seeds.</i>
Angelica Archangelica. <i>Semina.</i>	Garden Angelica. <i>The seeds.</i>
Angustura. <i>Vide Bonplandia trifoliata.</i>	See Bonplandia.

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Anisum. <i>Vide</i> Pimpinella.	<i>See</i> Pimpinella.
Anthemis nobilis. <i>Flores.</i>	Common Chamomile. <i>The flowers.</i>
Anthemis Pyrethrum. <i>Radix.</i>	Pellitory of Spain. <i>The root.</i>
Antimonii Sulphuretum.	Sulphuret of Antimony.
Arbutus Uva Ursi. <i>Folia.</i>	Red berried trailing Arbutus, or Bearberry. <i>The leaves.</i>
Arctium Lappa. <i>Semina. Radix.</i>	Burdock. <i>Seeds and root.</i>
Argentum.	Silver.
Aristolochia Serpentaria. <i>Radix.</i>	Snake root or Birthworth. <i>The root.</i>
Arnica montana. <i>Flores. Folia. Radix.</i>	Mountain Arnica. <i>Flowers. Leaves. Root.</i>
Arsenici Oxydum album.	White arsenic.
Artemisia Absinthium. <i>Summitates florentes.</i>	Wormwood. <i>The flowering tops.</i>
Artemisia Chinensis et A. Indica. <i>Folia. Moxa.</i>	Chinese and Indian Mugwort. <i>The leaves. Moxa.</i>
Artemisia Santonica. <i>Semina.</i>	Tartarian Southernwood. <i>The seeds.</i>
Assafoetida. <i>Vide</i> Ferula.	<i>See</i> Ferula.
Asarum europaeum. <i>Folia.</i>	Asarabacca leaves.
Aspidium Filix mas. <i>Radix.</i>	Male Fern. <i>The root.</i>
Astragalus creticus. <i>Gummi.</i>	Cretan Milkvetch. <i>The Gum.</i>
DE CANDOLLE. AS- TRAGOLOGIA.	
Atropa Belladonna. <i>Folia et Radix.</i>	Deadly night-shade. <i>Leaves and root.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
<i>Avena sativa. Farina ex Seminibus.</i>	Common Oat grass. <i>The flour from the seeds.</i>
<i>Balsamum Canadense. Vide Pinus.</i>	Canada Balsam. <i>See Pinus.</i>
<i>Barilla. Vide Sodae Carbonas venale.</i>	<i>Barilla. See Sodae Carbonas venale.</i>
<i>Barytae Sulphas.</i>	Sulphate of Barytes.
<i>Bismuthum.</i>	Bismuth.
<i>Bitumen Petroleum. Petroleum Barbadosense.</i>	Barbadoes tar.
<i>Bonplandia trifoliata. Cortex Angustura. HUMBOLDT ET BONPLAND PLANTAE ÆQUINOTIALES.</i>	Angustura bark.
<i>Borax. Vide Sodae Boras.</i>	<i>See Sodae Boras.</i>
<i>Boswellia serrata. Gummi resina. ROXBURGH.</i>	Olibanum.
<i>Bubon Galbanum. Gummi resina.</i>	Lovage leaved Bubon. <i>Gum resin.</i>
<i>Calamina. Vide Zinci Carbonas impurum.</i>	<i>See Zinci Carbonas impurum.</i>
<i>Calcis Car- } Creta alba. } Marmor album.</i>	Carbonate } White chalk. } of Lime. } White marble.
<i>Calx recens usta.</i>	Lime recently burned.
<i>Camphora. Vide Laurus.</i>	<i>See Laurus.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Canella alba. <i>Cortex.</i>	Laurel leaved Canella. <i>The Bark.</i>
Cantharis vesicatoria.	Cantharides. Spanish flies.
LATREILLE GEN. CRUSTAC. ET INSECT.	
LAMARCK HIST. NAT. DES ANIMAUX SANS VER- TEBRES.	
Capsicum annuum. <i>Capsulae cum seminibus.</i>	Cayenne pepper. <i>The Cap- sules with the seeds.</i>
Carbo Ligni.	Wood Charcoal.
Cardamine pratensis. <i>Flores.</i>	Cuckoo flower. <i>The flowers.</i>
Caryophyllus. <i>Vide Eugenia.</i>	<i>See Eugenia.</i>
Carum Carui. <i>Semina.</i>	Common Caraway. <i>The seeds.</i>
Cascarilla. <i>Vide Croton.</i>	<i>See Croton.</i>
Cassia Fistula. <i>Pulpa legu- minis</i>	Purging Cassia. <i>The pulp of the pod.</i>
Cassia. <i>Vide Laurus.</i>	<i>See Laurus.</i>
Cassia Senna. <i>Folia.</i>	Senna. <i>The leaves.</i>
Castor Fiber. Castoreum.	Castor beaver. Castor.
Catechu. <i>Vide Acacia.</i>	<i>See Acacia.</i>
Centaurea benedicta. <i>Vide Cnicus.</i>	<i>See Cnicus.</i>
Centaureum. <i>Vide Erythræa.</i>	<i>See Erythræa.</i>
Cephæelis Ipecacuanha. <i>Ra- dix.</i>	Ipecacuanha root.
	RICHARD.
Cera alba.	White wax.
Cera flava.	Yellow wax.
Cerevisiæ Fermentum.	Yeast.

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.	
Cerussa. <i>Vide</i> Plumbi Carbonas.	See Plumbi Carbonas.	
Cetaceum.	Spermaceti.	
Cetraria Islandica. <i>Planta.</i>	Iceland Liverwort.	
Chamaemelum. <i>Vide</i> Anthemis nobilis.	See Anthemis nobilis.	
Chironia. <i>Vide</i> Erythræa.	See Erythræa.	
Cinchona cordifolia. <i>Cortex.</i>	Zea, Annales du Museum d'Histoire Naturelle.	Yellow bark.
<i>Cinchona flava. Cortex.</i>		
Cinchona lancifolia. <i>Cortex.</i>		Pale bark.
<i>Cinchona officinalis. Cortex.</i>		
Cinchona oblongifolia. <i>Cortex.</i>		Red bark.
<i>Cinch. rubra. Cortex.</i>		
Cinnamomum. <i>Vide</i> Laurus.	See Laurus.	
Citrus Aurantium. <i>Fructus succus et tunica exterior. Flores. Folia.</i>	The Orange Tree. <i>The juice and outer coat of the fruit. The flowers. The leaves.</i>	
Citrus medica— <i>Fructus succus, tunica exterior et ejus Oleum volatile.</i>	The Lemon Tree. <i>The juice and outer coat of the fruit and its volatile oil.</i>	
Cnicus benedictus. <i>Folia.</i>	Blessed Thistle. <i>The leaves.</i>	
GAERTNER.		
Cocculus suberosus. <i>Fructus vulgo Cocculus indicus.</i>	Indian Berry. <i>The fruit commonly named Cocculus indicus.</i>	
DE CANDOLLE.		

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Coccus Cacti.	Cochineal.
Cochlearia Armoracia. <i>Radix.</i>	Horse radish. <i>The root.</i>
Cochlearia officinalis. <i>Herba.</i>	Common Scurvy Grass. <i>The herb.</i>
Colchicum autumnale. <i>Bulbus. Semina.</i>	Meadow Saffron. <i>The bulb. The seeds.</i>
Colomba. <i>Radix.</i>	Colomba root.
Conium maculatum. <i>Folia.</i>	Common Hemlock. <i>The leaves.</i>
Convolvulus Jalapa. <i>Radix.</i>	Jalap. <i>The root.</i>
Convolvulus Scammonia. <i>Gummi Resina.</i>	Scammony. <i>Gum resin.</i>
Copaifera officinalis. <i>Resina liquida.</i>	Copaiba Balsam.
Coriandrum sativum. <i>Semina.</i>	Common Coriander. <i>The seeds.</i>
Cornua Cervina. <i>Ramenta.</i>	Hartshorn shavings.
Creta. <i>Vide Calcis Carbonas.</i>	See Calcis Carbonas.
Crocus sativus. <i>Stigmata.</i>	Saffron Crocus. <i>The stigmata.</i>
Croton Cascarilla. <i>Cortex.</i>	Cascarilla. <i>The bark.</i>
Croton Tiglium. <i>Oleum e seminibus expressum.</i>	Purging Croton. <i>The oil expressed from the seeds.</i>
DE CANDOLLE.	
Cubeba. <i>Vide Piper.</i>	See Piper.
Cucumis Colocynthis. <i>Fructus pulpa.</i>	Bitter Cucumber. <i>The pulp of the fruit.</i>
Cupri Acetas. <i>Crystalli.</i>	Acetate of Copper. <i>The crystals.</i>
Cupri Subacetas.	Subacetate of Copper. <i>Verdigris.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Cupri Sulphas.	Sulphate of Copper. Blue Vi- triol.
Curcuma longa. <i>Radix.</i>	Long-rooted turmeric. <i>The</i> <i>root.</i>
Daphne Mezereum. <i>Cortex.</i>	Common Spurge Olive or Me- zereon. <i>The bark.</i>
Datura Stramonium. <i>Herba.</i> <i>Semina.</i>	Common thorn apple. <i>The</i> <i>herb. The seeds.</i>
Daucus Carota. <i>Radix.</i>	Wild carrot. <i>The root.</i>
Daucus Carota. Var. Sylves- tris. <i>Semina.</i>	Wild carrot. Var. Sylvestris. <i>The seeds.</i>
Delphinium Staphisagria. <i>Se- mina.</i>	Stavesacre. <i>The seeds.</i>
Dianthus Caryophyllus. <i>Flo- res.</i>	Clove pink. <i>The flowers.</i>
Digitalis purpurea. <i>Folia.</i>	Purple Foxglove. <i>The leaves.</i>
Diosma crenata. <i>Folia.</i> Buchu.	Buchu. <i>The leaves.</i>
Dolichos pruriens. <i>Pubes Le- guminis.</i>	Cowhage. <i>The hairy down of</i> <i>the pod.</i>
Drimys aromatica. <i>Cortex.</i>	Winter's bark.
DE CANDOLLE.	
Dryobalanops Camphora.	Camphor tree. <i>Camphor.</i>
COLEBROOKE.	
Dulcamara. <i>Vide Solanum.</i>	<i>See Solanum.</i>
Elaterium. <i>Vide Momordica.</i>	<i>See Momordica.</i>
Elemi. <i>Vide Amyris.</i>	<i>See Amyris.</i>
Erythræa Centaureum. <i>Folia.</i>	Common Centaury. <i>The</i> PERSOON. <i>leaves.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Euphorbia Canariensis. <i>Gummi resina.</i>	Euphorbium Spurge. <i>Gum resin.</i>
Eugenia caryophyllata. <i>Flores nondum expliciti, et Oleum volatile.</i>	The Clove Tree. <i>The unopened flowers, and Volatile oil.</i>
Fœniculum. <i>Vide Anethum.</i>	<i>See Anethum.</i>
Ferrum. <i>Fila. Scobs. Oxydi squamæ.</i>	Iron. <i>Wire. Filings. Scales of the Oxide.</i>
Ferri Cyanuretum.	Cyanuret of Iron, Prussian Blue.
Ferula Assafoetida. <i>Gummi Resina.</i>	Assafoetida, Giant Fennel. <i>Gum resin.</i>
Ficus Carica. <i>Fructus siccatus.</i>	Common Fig Tree. <i>The dried fruit.</i>
Filix mas. <i>Vide Aspidium.</i>	<i>See Aspidium.</i>
Fraxinus Ornus. <i>Succus concretus Manna.</i>	Flowering Ash. <i>The concrete juice Manna.</i>
Fucus vesiculosus. <i>Herba cum fructu.</i>	Bladder-Wrack. <i>The herb bearing the fruit.</i>
Galbanum. <i>Vide Bubon.</i>	<i>See Bubon.</i>
Gallæ. <i>Vide Quercus infectoria.</i>	<i>See Quercus infectoria.</i>
Gambogia. <i>Vide Stalagmitis.</i>	<i>See Stalagmitis.</i>
Gentiana lutea. <i>Radix.</i>	Yellow Gentian. <i>The root.</i>
Geoffroya inermis. <i>Cortex.</i>	Bastard Cabbage Tree. <i>The bark.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Geum urbanum. <i>Radix.</i>	Common Avens, or Herb Bennet. <i>The root.</i>
Glycyrrhiza glabra. <i>Radix.</i>	Common Liquorice. <i>The root.</i>
Guaiacum officinale. <i>Lignum.</i> <i>Resina.</i>	Lignum Vitæ Tree. <i>The wood and resin.</i>
Hæmatoxylum Campechianum. <i>Lignum.</i>	Logwood. <i>The wood.</i>
Helleborus niger. <i>Radix.</i>	Black Hellebore or Christmas Rose. <i>The root.</i>
Heracleum gummiferum. <i>Gummi Resina.</i>	Gum-bearing Cow Parsnep. <i>The gum resin.</i>
Hirudo medicinalis.	The Leech.
Hordeum distichon. <i>Semina decorticata.</i>	Common Barley. <i>The shelled seeds.</i>
Humulus Lupulus. <i>Strobili Siccati.</i>	The Hop. <i>The dried strobiles.</i>
Hydrargyrum.	Mercury or Quicksilver.
Hyoscyamus niger. <i>Folia.</i>	Common Henbane. <i>The leaves.</i>
Jalapa. <i>Vide Convolvulus.</i>	See Convolvulus.
Inula Helenium. <i>Radix.</i>	Common Inula or Elecampane. <i>The root.</i>
Iodinium.	Iodine.
Juniperus communis. <i>Baccæ. Cacumina.</i>	Common Juniper. <i>The berries and tops.</i>
Juniperus Sabina. <i>Folia.</i>	Common Savin. <i>The leaves.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Kino.	Kino.
Krameria triandra. <i>Radix et extractum.</i> RUIZ.	Rhatany. <i>The root, and extract.</i>
Lactuca sativa. <i>Herba.</i>	Garden Lettuce. <i>The herb.</i>
Lactuca virosa. <i>Folia.</i>	Strong scented Lettuce. <i>The leaves.</i>
Lavandula Spica. <i>Flores.</i>	Common Lavender. <i>The flowers.</i>
Laurus Camphora. <i>Camphora. vide etiam Dryobalanops.</i>	Camphor Tree. <i>Camphor. See also Dryobalanops.</i>
Laurus Cassia. <i>Cortex.</i>	Bastard Cinnamon Laurel. <i>The bark.</i>
Laurus Cinnamomum. <i>Cortex et Oleum volatile.</i>	Cinnamon Laurel. <i>The bark and Volatile oil.</i>
Laurus nobilis. <i>Folia. Baccæ.</i>	Common Sweet Bay. <i>The leaves and berries.</i>
Laurus Sassafras. <i>Lignum, radix, et Oleum volatile.</i>	Sassafras tree. <i>The wood, root, and Volatile oil.</i>
Leontodon Taraxacum. <i>Herba. Radix.</i>	Common Dandelion. <i>The herb and root.</i>
Lichen Islandicus. <i>Vide Cetraria.</i>	<i>See Cetraria.</i>
Limones. <i>Vide Citrus medica.</i>	<i>See Citrus medica.</i>
Linum usitatissimum. <i>Semina. Oleum e seminibus expressum.</i>	Common Flax. <i>The seeds, and their expressed oil.</i>
Lithargyrum. <i>Vide Plumbi oxydum semivitreum.</i>	Litharge. <i>See Plumbi oxydum semivitreum.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Litmus. <i>Vide</i> Roccella.	<i>See</i> Roccella.
Lixivus cinis.	Potashes. Pearlashes.
Lythrum Salicaria. <i>Herba.</i>	Loosestrife. <i>The herb.</i>
Magnesiæ Sulphas.	Sulphate of Magnesia. Epsom Salts.
Manna. <i>Vide</i> Fraxinus Or-nus.	<i>See</i> Fraxinus Ornus.
Manganesii oxydum.	Oxide of Manganese.
Marrubium vulgare.	Common white Horehound.
Mastiche. <i>Vide</i> Pistachia.	<i>See</i> Pistachia.
Mel.	Honey.
Melaleuca Leucadendron. <i>Oleum volatile Cajeput.</i>	Cajeput Tree. <i>The volatile oil of Cajeput.</i>
Melissa officinalis. <i>Herba.</i>	Common Balm. <i>The herb.</i>
Mentha piperita. <i>Herba.</i>	Peppermint. <i>The herb.</i>
Mentha viridis. <i>Herba.</i>	Spearmint. <i>The herb.</i>
Mentha Pulegium. <i>Herba.</i>	Pennyroyal. <i>The herb.</i>
Menyanthes trifoliata. <i>Folia.</i>	Common Buck-bean. <i>The leaves.</i>
Mezereon. <i>Vide</i> Daphne.	<i>See</i> Daphne.
Momordica Elaterium. <i>Fructus. Fæcula. Folia.</i>	Wild or squirting Cucumber. <i>Fruit. Fæcula. Leaves.</i>
Morus nigra. <i>Baccæ.</i>	Common Mulberries.
Moschus moschiferus. <i>Concretum Moschus dictum.</i>	<i>The concretion obtained from the Musk Deer, called Musk.</i>
Moxa. <i>Vide</i> Artemisia.	Moxa. <i>See</i> Artemisia.

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Myristica moschata. <i>Nucleus.</i>	The Nutmeg tree. <i>The kernel.</i>
<i>Oleum volatile et involucrum</i> MACIS dictum.	<i>The volatile oil, and the tunic called</i> MACE.
Myroxylum Peruvianum. <i>Balsamum.</i>	Sweet smelling Balsam tree. <i>The Balsam called Peruvian Balsam.</i>
Myrrha.	Myrrh.
Myrtus Pimenta. <i>Fructus.</i>	All-spice or Jamaica Pepper.
Nicotiana Tabacum. <i>Folia.</i>	Tobacco leaves.
Nitrum. <i>Vide</i> Potassæ Nitras.	<i>See</i> Potassæ Nitras.
Nux moschata. <i>Vide</i> Myristica.	Nutmeg. <i>See</i> Myristica.
Nux Vomica. <i>Vide</i> Strychnos.	<i>See</i> Strychnos.
Olea Europæa. <i>Oleum ex fructu.</i>	Olive oil.
Olibanum. <i>Vide</i> Boswellia serrata.	Olibanum. <i>See</i> Boswellia serrata.
Opium. <i>Vide</i> Papaver.	Opium. <i>See</i> Papaver.
Opoponax. <i>Vide</i> Pastinaca.	Opoponax. <i>See</i> Pastinaca.
Origanum Majorana. <i>Herba.</i>	Sweet Marjoram. <i>The herb.</i>
Origanum vulgare. <i>Oleum ex herba.</i>	Common Marjoram. <i>Oil from the herb.</i>
Ossa.	Bones.
Papaver Rhœas. <i>Petala.</i>	Common red Poppy. <i>The petals.</i>
Papaver somniferum. <i>Capsularum succus proprius concretus, Capsulæ maturæ.</i>	Common white Poppy. <i>The succus proprius of the capsules, concreted. The ripe capsules.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Pastinaca Opoponax. <i>Gummi Resina.</i>	Rough parsnep. <i>Gum resin.</i>
Petroleum. <i>Vide Bitumen.</i>	See Bitumen.
Pimenta. <i>Vide Myrtus.</i>	See Myrtus.
Pimpinella Anisum. <i>Semina.</i>	Anise. <i>The seeds.</i>
Pinus Abies. <i>Resina. Thus.</i>	Norway Spruce Fir. <i>The Resin. Frankincense.</i>
Pinus Balsamea. <i>Resina liquida.</i>	Balm of Gilead Fir. <i>The liquid resin.</i>
Pinus Larix. <i>Resina liquida.</i>	White Larch. <i>The liquid resin. Venice Turpentine.</i>
Pinus sylvestris. <i>Resina. Oleum volatile. Terebinthina vulgaris.</i>	Scotch Fir. <i>The resin. Volatile Oil. Common Turpentine.</i>
Piper Cubeba. <i>Fructus.</i>	Cubebs, or Java Pepper.
Piper nigrum. <i>Semina.</i>	Black Pepper.
Piper longum. <i>Semina.</i>	Long Pepper.
Pistacia Lentiscus. <i>Resina.</i>	Mastich Tree. <i>The resin.</i>
Pistacia Terebinthinus.	Chian Turpentine.
Pix Burgundica. <i>Vide Pinus Abies.</i>	Burgundy Pitch. <i>See Pinus Abies.</i>
Pix liquida. <i>E speciebus Pini diversis.</i>	Tar. <i>From different kinds of Pine.</i>
Plumbi Carbonas.	Carbonate of Lead. White Lead.
Plumbi Oxydum semivitreum.	Litharge.
Polygala Senega. <i>Radix.</i>	Rattlesnake root.
Polygonum Bistorta. <i>Radix.</i>	Great Bistort root.
Potassæ Nitras.	Nitrate of Potash. Nitre. Saltpetre.

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Potassæ Bitartras.	Cream or Crystals of Tartar.
Prunus domestica. <i>Fructus siccatus.</i>	Common plum. <i>The dried fruit. Prunes.</i>
Prunus Lauro-Cerasus. <i>Folia.</i>	Common or cherry laurel. <i>The leaves.</i>
Pterocarpus santalinus. <i>Lignum.</i>	Red Saunders wood.
Pulegium. <i>Vide Mentha.</i>	See Mentha.
Punica Granatum. <i>Baccæ tunica exterior. Radicis cortex. Flores.</i>	Pomegranate tree. <i>The external covering of the fruit. The bark of the root. The flowers.</i>
Pyrethrum. <i>Vide Anthemis.</i>	See Anthemis.
Pyrola umbellata. <i>Herba.</i>	Umbelled Winter-green. <i>The herb.</i>
Quassia excelsa. <i>Lignum.</i>	Lofty Quassia. <i>The wood.</i>
Quassia Simaruba. <i>Cortex radicis.</i>	Winged leaved Quassia. <i>The bark of the root.</i>
Quercus infectoria.	Dyer's oak.
Quercus Robur. <i>Cortex.</i>	Common Oak. <i>The bark.</i>
Ranunculus acris. <i>Folia.</i>	Single upright Crowfoot. <i>The leaves.</i>
Ranunculus Flammula. <i>Herba recens.</i>	Lesser Spear-wort. <i>The fresh herb.</i>
Rhamnus catharticus. <i>Baccæ.</i>	Purging Buckthorn. <i>The berries.</i>
Rhatania. <i>Vide Krameria.</i>	Rhatany root. <i>See Krameria.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Rheum palmatum, } <i>Radix.</i>	Palmated Rhubarb, } <i>The</i>
et	and
Rheum undulatum. }	Wave-leaved Rhubarb. } <i>root.</i>
Rhus Toxicodendron. <i>Folia.</i>	Poison Oak, or Sumach. <i>The</i>
	<i>leaves.</i>
Ricinus communis. <i>Oleum e</i>	Castor Oil plant. Palma Christi.
<i>seminibus.</i>	<i>The oil from the seeds.</i>
Roccella tinctoria. <i>Litmus.</i>	Roccella. <i>Litmus.</i>
ACHARIUS.	
Rosa canina. <i>Fructus.</i>	Dog Rose. <i>The fruit.</i>
Rosa centifolia. <i>Petala.</i>	Hundred-leaved Rose. <i>The</i>
	<i>petals.</i>
Rosa Gallica. <i>Petala.</i>	Red Rose. <i>The petals.</i>
Rosmarinus officinalis. <i>Cacu-</i>	Rosemary. <i>The tops.</i>
<i>mina.</i>	
Rubia tinctorum. <i>Radix.</i>	Dyer's Madder. <i>The root.</i>
Rumex acetosa. <i>Folia.</i>	Common Sorrel. <i>The leaves.</i>
Rumex aquaticus. <i>Radix.</i>	Great Water Dock. <i>The root.</i>
Ruta graveolens. <i>Folia.</i>	Common Rue. <i>The leaves.</i>
Saccharum officinarum. <i>Suc-</i>	Common Sugar Cane. <i>The</i>
<i>cus concretus, a. non pu-</i>	<i>concrete juice, a. raw. b.</i>
<i>rificatus. b. purificatus.</i>	<i>refined. The empyreu-</i>
<i>Syrupus empyreumati-</i>	<i>matic syrup called Mo-</i>
<i>cus anglicè Molasses.</i>	<i>lasses.</i>
Sagapenum. <i>Gummi resina.</i>	Sagapenum. <i>Gum resin.</i>
Salix fragilis. <i>Cortex.</i>	Crack Willow. <i>The bark.</i>
Salix alba. <i>Cortex.</i>	Common white Willow. <i>The</i>
	<i>bark.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
<i>Salix caprea. Cortex.</i>	Great round-leaved Sallow. <i>The bark.</i>
<i>Sambucus nigra. Flores. Baccæ. Cortex interior.</i>	Black-berried Elder. <i>The flowers. The berries. The inner bark.</i>
<i>Santalum rubrum. Vide Pterocarpus.</i>	<i>See Pterocarpus.</i>
<i>Sapo durus.</i>	Hard Soap.
<i>Sapo mollis.</i>	Soft Soap.
<i>Sarsaparilla. Vide Smilax.</i>	<i>See Smilax.</i>
<i>Sassafras. Vide Laurus.</i>	<i>See Laurus.</i>
<i>Scammonium. Vide Convolvulus.</i>	<i>See Convolvulus.</i>
<i>Scilla maritima. Bulbus.</i>	Red-Rooted officinal Squill. <i>The bulb.</i>
<i>Scrophularia nodosa. Folia.</i>	Knotty-rooted Figwort. <i>The leaves.</i>
<i>Senna. Vide Cassia.</i>	<i>See Cassia.</i>
<i>Sinapis alba. Semina.</i>	White Mustard. <i>The seeds.</i>
<i>Sinapis nigra. Seminum pulveris.</i>	Common Mustard. <i>Powder of the seeds.</i>
<i>Smilax Sarsaparilla. Radix.</i>	Sarsaparilla. <i>The root.</i>
<i>Sodæ Boras.</i>	Borate of Soda. Borax.
<i>Sodæ Carbonas venale. Barilla.</i>	Carbonate of Soda of commerce. Barilla.
<i>Sodæ Murias.</i>	Muriate of Soda. Common Salt.
<i>Solanum Dulcamara. Caules.</i>	Woody Night-shade, or Bitter Sweet. <i>The stalks.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Spartium Scoparium. <i>Cacumina.</i>	Common Broom. <i>The summits.</i>
Spigelia Marilandica. <i>Radix.</i>	Perennial Worm-grass. <i>The root.</i>
Spiritus rectificatus. <i>Hujus pondus specificum sit 844 ad gradum caloris 51^m, vel 840 ad gradum caloris 60^m.</i>	Rectified Spirit. <i>The specific gravity of which should be 844 at a temperature of 51° or 840 at a temperature of 60°.</i>
Spiritus tenuior. <i>Hujus pondus specificum sit 923 ad gradum caloris 51^m. vel 919 ad gradum caloris 60^m.</i>	Proof Spirit. <i>The specific gravity of which should be 923 at a temperature of 51°, or 919 at a temperature of 60°.</i>
Spiritus fere omnis qui sub nomine PROOF SPIRIT prostat venalis, oleo empyreumatico inquinatus et ad usum medicum ineptus est : Spiritus ejusdem ferè ponderis specifici conficitur commiscendo partes $5\frac{1}{4}$ Spiritus rectificati, mensurâ sumptas, cum partibus tribus itidem mensurâ, aquæ distillatæ ad gradum caloris 60 ^m .	Almost all the Spirit which is sold under the name of PROOF SPIRIT is contaminated with empyreumatic oil, and unfit for medical use : Spirit of almost the same specific gravity is made by mixing together $5\frac{1}{4}$ parts of rectified Spirit, by measure, with three parts of distilled water, also by measure, at a temperature of 60°.
Spongia officinalis.	Sponge.
Stalagmitis Cambogia.	The Gamboge Tree.
Stannum.	Tin.
Stramonium. <i>Vide Datura.</i>	See Datura.

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Strychnos Nux vomica.	Nux vomica, or poison nut.
Styrax Benzoin. <i>Resina.</i>	Benjamin tree. <i>The resin.</i>
Styrax officinale. <i>Resina.</i>	Officinal Storax. <i>The resin.</i>
Succinum.	Amber.
Sulphur sublimatum.	Sublimed Sulphur.
Tamarindus Indicus. <i>Legumi- minis pulpa.</i>	The Tamarind Tree. <i>The pulp of the pod.</i>
Tanacetum vulgare. <i>Folia.</i>	Common Tansy. <i>The leaves.</i>
Tartari Crystalli. <i>Vide Potas- sæ Bitartras.</i>	See Potassæ Bitartras.
Terebinthina Chia. <i>Vide Pis- tacia.</i>	See Pistacia.
Terebinthina Veneta. <i>Vide Pi- nus Larix.</i>	See Pinus Larix.
Toluifera Balsamum. <i>Resina.</i>	Balsam of Tolu.
Tormentilla officinalis. SMITH	Common Tormentil, or Septfoil.
FLORA BRITANNICA.	
Tragacantha Gummi. <i>Vide Astragalus.</i>	See Astragalus.
Triticum hybernum. <i>Seminum farina.</i>	Wheat. <i>The flour.</i>
Tussilago Farfara. <i>Folia. Flo- res.</i>	Common Colts-foot. <i>The leaves and flowers.</i>
Valeriana officinalis. <i>Radix.</i>	Great Wild Valerian. <i>The root.</i>
Veratrum album. <i>Radix.</i>	White Hellebore. <i>The root.</i>
Verbascum Thapsus. <i>Folia.</i>	Great Mullein, or High Taper. <i>The leaves.</i>

SYSTEMATIC NAME.	OFFICINAL, OR VULGAR NAME.
Vinum album Hispanum.	White Spanish wine.
Viola odorata. <i>Flores.</i>	Sweet Violet. <i>The flowers.</i>
Vitis vinifera. <i>Fructus siccatus.</i>	Common Vine. <i>Raisins.</i>
Ulmus campestris. <i>Cortex interior.</i>	Common Elm. <i>The inner bark.</i>
Uva Ursi. <i>Vide Arbutus.</i>	<i>See Arbutus.</i>
Wintera aromatica. <i>Vide Drimys.</i>	<i>See Drimys.</i>
Zincum.	Zinc.
Zinci Carbonas impurum.	Impure Carbonate of Zinc. Calamine.
Zingiber. <i>Vide Amomum.</i>	<i>See Amomum.</i>

PREPARATIONS.

SECTION I.

ACIDS.

DISTILLED VINEGAR.

Take of Wine-vinegar *by measure*, ten parts.

Distil with a slow fire, *by measure* eight parts. In the distillation glass vessels should be employed, and the first portion which comes over, in quantity amounting to one part, rejected.

The specific gravity of this acid is to that of distilled water as 1005 to 1000.

REMARKS.—The preparation here directed is that of Acetic Acid largely diluted with water.

Vinegar, a product of acetous fermentation in a vinous liquor, is an impure compound, containing, with Acetic Acid and water, also vegetable mucilage, gluten, sugar, extractive matter, often some Malic and Tartaric Acids, and a minute portion of Tartar, with a small quantity of Alcohol and Pyroacetic Spirit. Microscopic insects are generally present in Wine-vinegar.

To obtain the diluted Acetic Acid, detached from impurities, and to obviate the decomposition which Vine-

gar when long kept, undergoes, is the object of the present process. Of the different ingredients of Vinegar, some are volatile, and rise when the fluid is heated to near 212° . The volatile ingredients are Alcohol, Pyroacetic Spirit, Acetic Acid, and Water. Of these the Alcohol and Pyroacetic Spirit are the most volatile, and when Vinegar is distilled, rise with the first portions of vaporized compound. For this reason we are directed to reject the first portion, or of the whole fluid employed one-tenth part, as this contains the Alcohol and Pyroacetic spirit. By proceeding with the distillation, and distilling seven parts more, we obtain a large proportion of the pure Acetic Acid united to water. The process is then to be stopped, lest the impurities should pass over and contaminate the distilled Vinegar; this will happen if the heat rises to the degree which occasions decomposition, in which case an empyreumatic flavour will be given to the product.

A stronger Vinegar is obtained from wine than from liquors merely saccharine, or produced by fermented malt; for which reason the Vinegar of Wine is directed in this process. White wines are found to afford the strongest vinegar.

In the Pharmacopœia of 1807, six-tenth parts of the Vinegar employed were distilled over, the first tenth part being rejected; but experiment proved that on continuing the distillation, the diluted acetic acid which then came over was as strong as that which had preceded it, and equally free from empyreuma: it was therefore thought advisable to increase the proportional quantity to be distilled over, leaving a smaller residue in the retort, and rendering the process more productive.

In this process the use of glass vessels is directed, as the Vinegar would dissolve a portion of a metallic vessel if composed of the metals usually employed, lead, iron, or copper. Lead dissolved in the Vinegar may be de-

tected by the addition of water impregnated with Sulphuretted Hydrogen, and by a solution of Sulphate of Soda; the first of these re-agents producing a brownish coloured precipitate of Sulphuret of Lead; the second a white precipitate of Sulphate of Lead. Iron is ascertained to be present by a solution of Prussiate of Potash, which gives a blue tinge to the acid, or affords a blue precipitate. The presence of copper is indicated by a clean plate of iron immersed in the acid, a rose-coloured coating of copper appearing on the surface of the iron. Copper is also discovered by adding water of ammonia till the alkali predominates in the mixture, in which case an azure blue colour appears.

PROPERTIES, AND TESTS OF ITS PURITY.—Distilled Vinegar should have an agreeable acid smell and taste. It should form soluble salts with the alkalies and alkaline earths and with the Oxide of Lead; but with Protoxide of Mercury, a salt of sparing solubility.

Vinegar is often adulterated by means of Sulphuric Acid. This may be detected by the addition of a Barytic Salt, which will afford a precipitate insoluble in Nitric or Muriatic Acid. This impurity is often present, as the preparer is allowed to mix one-thousandth part of Sulphuric Acid with the Vinegar. Whether the Sulphuric Acid detected by the Barytic Salt exists in the Vinegar in a disengaged state, or in combination with a fixed alkaline base, may be ascertained by evaporating the Vinegar to one-seventh or one-eighth of its original volume; dividing the residue into two portions, neutralizing one of these with pure Carbonate of Lime, separating the liquor from the undissolved part of the mixture, and having ascertained whether the base of the salt contained in the dissolved part is Potash or Soda, decomposing the solution by addition of a dissolved Barytic Salt, the precipitated sulphate when collected, dried, and weighed, making allowance for the sulphate of lime which is present, in-

dicates the quantity of Sulphate of Potash or Soda. The quantity of free Sulphuric Acid in the other portion, may be determined, by adding an aqueous solution of a salt of Baryta sufficient to throw down the whole of the Sulphuric Acid; the difference between the weight of this and of the former precipitate when dried, will give the quantity of *disengaged* Sulphuric Acid.

Muriatic Acid is detected by adding Nitrate of Silver, which produces a white precipitate assuming a pearl colour on exposure to light and dissolving in Water of Ammonia.

The presence of Nitric Acid may be ascertained by addition of a mixture of diluted Sulphuric and Muriatic Acids, through which gold leaf has been diffused; for if Nitric Acid is present, on applying heat the gold will be dissolved, the liquor will acquire an orange yellow tinge, and afford a purple precipitate with fresh prepared Muriate of Tin.

Sulphureous Acid is sometimes present in distilled Vinegar.

An impure Vinegar of a brown colour and strong empyreumatic smell, is prepared by exposing wood to heat in large iron cylinders; it is commonly named Pyrolignous Acid. From this a pure acetic acid, exceeding in strength the Vinegar of commerce, is obtained. Different means are employed for this purpose. The following was practised with advantage. An Acetate of Lead was prepared with the impure Acetic or Pyrolignous Acid, and the salt, purified by crystallization and dissolved in water, was decomposed by a solution of Sulphate of Soda. The Acetate of Soda thus obtained in aqueous solution, and separated from the Sulphate of Lead was mixed with Sulphuric Acid, and the diluted Acetic Acid obtained by distillation of the mixture in glass vessels.

Specific gravity is an insufficient test of the strength of common Vinegar, which varies in its specific gravity

from 1010 to 1025. A part of this increased specific gravity, in common vinegar, is derived from mucilage and saline matter; on the other hand, the specific gravity of distilled Vinegar is not unfrequently diminished by the presence of that peculiar fluid named Pyroacetic Spirit, into which Acetic Acid, when united to a base, and exposed to heat is convertible. Pyroacetic spirit is known by these characters: it is of specific gravity 786, when rectified from dry muriate of Lime; it boils at 138° of Far.; it is combustible, burning with a blue flame and a peculiar smell, and it unites in every proportion with water, alcohol, the fixed and volatile oils.

The specific gravity of both common and distilled Vinegar may also be diminished by the presence of Alcohol. Hence it is evident that specific gravity is not a rigidly accurate test of the strength of these acids. It has been ascertained that neither Pyroacetic Spirit nor Alcohol are present in any sensible quantity in the distilled Vinegar as obtained by the process of this Pharmacopœia. The most certain test of the strength of distilled Vinegar is the quantity of Carbonate of Lime or dry Carbonate of Soda required to neutralize a known weight of the acid, it being premised that 50 parts of real Acetic Acid neutralize 50 parts of Carbonate of Lime, and 54 parts of dry Carbonate Soda.

100 parts of distilled Vinegar, of specific gravity 1005, require 5.2 parts of dry Carbonate of Soda for neutralization, and therefore contain 4.81 parts of real Acetic Acid.

USES.—*Pharmaceutical*. Distilled Vinegar is employed in the preparation of several of the Acetates; of Potassæ Acetas, Sodæ Acetas, Hydrargyri Acetas, Plumbi Subacetatis Liquor, and in the preparation of the compounds included in the class of Aceta medicata; viz. Acidum Aceticum Camphoratum, Acetum Colchici, Acetum Opii, Acetum Scillæ.

—*Medicinal*. It is sometimes given internally as a re-

frigerant, and mixed with water may be used as a diluent drink in cases of inflammatory fever; but for this purpose common vinegar is preferable, its flavour being more grateful than that of distilled vinegar. Acetic Acid, either as distilled vinegar or in the more concentrated form, increases the solubility of Acetate of Lead in water, and may be added to solutions of this salt, to prevent the decomposition which arises in neutral Acetate of Lead from exposure to Carbonic Acid. Either distilled or common vinegar is supposed to produce some anti-narcotic effect: on the contrary, Orfila found it to increase the activity of Opium taken into the stomach: this might be expected from the nature of those principles on which the powers of Opium depend; their solubility and action being increased by union with the Acetous Acid.

In cases of diseased digestive and urinary organs, attended by a deposition of the Phosphate of Lime or of the ammoniaco magnesian Phosphate in the urine, diluted Acetic Acid is beneficial. In obstinate constipation, vinegar is administered with advantage as a glyster. It is also a useful fomentation in cases of burns or sprains. Its vapour is inhaled with benefit in putrid sore throat, and it has been proposed on obvious principles for removal of the dust of lime from the eyes.

DOSE.—Of distilled Vinegar, from one drachm to half an ounce.

ACETIC ACID.

Take of Acetate of Potash one hundred parts,
Sulphuric Acid fifty-two parts.

Put the acid into a tubulated retort, then gradually, and at different intervals of time, add the Acetate of Potash, waiting after each addition until the mixture becomes

cool. Lastly, with a moderate heat, distil the acid until the residuum is dry. The specific gravity of this acid is to that of distilled water as 1074 to 1000.

REMARKS.—The mixture of the salt with the acid is directed to be made *gradually*, for the purpose of obviating the considerable heat, effervescence, and loss of product attendant on the sudden mixture of the materials in a large quantity. On applying a moderate heat to the retort containing the salt and acid, Acetic Acid is volatilized and passes over into the receiver. The acid thus obtained, differs from Distilled Vinegar in containing Acetic Acid nearly detached from water.

The quantities of the different ingredients in this process may be thus represented:—Here it should be observed, that in this, as in all subsequent examples of the same kind, the number prefixed to the name of the substance expresses the number of prime equivalents or atoms which enter into the compound. Thus, 2 water implies that there are two equivalents or atoms of water.

Materials.

1 Acetic Acid	= 50	1 Sulphuric Acid	= 40
1 Potash	= 48	1 Water	= 9
2 Water	= 18		—
	—	1 Liquid Sulphuric Acid	= 49
1 Acetate of Potash	= 116		

Products.

1 Potash	= 48	1 Acetic Acid	= 50
1 Sulphuric Acid	= 40	3 Water	= 27
	—		—
1 Sulphate of Potash	= 88	1 Acetic Acid	= 77

Then 116 parts of Acetate of Potash will require 49 parts of strong Sulphuric Acid for decomposition, producing 77 parts of Acetic Acid, consisting of one prime equivalent or atom of acid = 50, united to three of water = 27. Therefore 100 parts of Acetate of Potash would be decomposed by 42.2 parts of Sulphuric Acid. A larger quantity of Sulphuric Acid is directed, according to the form prescribed by this Pharmacopœia, than is requisite for the decomposition of the Acetate of Potash: there is therefore some waste of the Sulphuric Acid; the product of Acetic Acid is also a little weaker than it would be if the exact equivalent quantity of Sulphuric Acid were employed. Some advantage, however, arises from the use of a quantity of Sulphuric Acid exceeding that pointed out by theory; as the residuum, containing Bisulphate of Potash is extracted from the retort more easily than if it consisted altogether of Sulphate of Potash, which is a very hard salt, requiring much water for solution.

The specific gravity of the acid obtained by this process is stated to be 1074. This corresponds pretty nearly with Dr. Thomas Thomson's determination of the specific gravities of atomic compounds of Acetic Acid and water. From his experiments it appears that the densest is not the strongest acid; a certain degree of dilution with water producing a condensation, which is greatest when the compound consists of one atom of acid united to four of water. See Dr. Thomson's First Principles of Chemistry, vol. 2, page 135. Acetic Acid has been obtained so strong as to form crystals at all temperatures below 50°. This acid is obtained by distilling a mixture of dry Acetate of Soda and strong Sulphuric Acid.

The Acetic Acid in its dry state is thus composed:

2 Hydrogen	=	2
4 Carbon	=	24
3 Oxygen	=	24
		—
1 Acetic Acid	=	50

The crystals, according to Dr. Thomson's determination, contain one equivalent or atom of water; the number representing the crystallized acid will therefore be 59.

USES.—*Pharmaceutical.* To prepare Acidum Aceticum Camphoratum.

—*Medicinal.* Inhaled by the nostrils, its strongly stimulating action is beneficial in Syncope, Hysteria, and Headach. Applied to the skin, it either acts as a rubefacient, or raises a blister, and is employed with advantage as an external application in inflammatory sore throat. It is also an active remedy for Warts, particularly of a venereal nature, to which use it is principally applied. It removes the unpleasant smell from close or ill ventilated rooms, and is by some physicians supposed to act as a corrector of infection: this opinion requires confirmation.

DOSE.—From 1 to 15 grains *by measure*, properly diluted.

The Acidum Aceticum of the London Pharmacopœia of 1815, is the Acidum Aceticum Dilutum of the Pharmacopœia of 1824, and these preparations are similar to the Distilled Vinegar of the Dublin Pharmacopœia, exceeding it a little in strength; they both differ from the Acidum aceticum of the Dublin Pharmacopœia, as the latter is the concentrated Acetic Acid.

PROPERTIES AND TESTS OF ITS PURITY.—It should have a very pungent smell, a strong acid taste, and the specific gravity assigned to it in the Pharmacopœia. It should afford no precipitate, with an aqueous solution of Baryta or of its salts. It should not destroy the colour of an infusion of the red rose; and when neutralized with an alkali it should not become turbid. Exposed to heat in a capsule of glass or platina, it should evaporate completely without leaving any residuum. The presence of any metallic salt derived either from the vessel used

in its distillation, or from other sources, may be detected by neutralizing the acid with ammonia, and examining different portions of it with Sulphuretted Hydrogen, Prussiate of Potash and Sulphate of Soda, according to the mode pointed out under the head of Distilled Vinegar.

BENZOIC ACID.

Take of Benzoin, five parts,
Lime fresh burnt,
Muriatic Acid, of each one part,
Water, two hundred parts.

Triturate the Benzoin with the Lime, then boil the mixture in one hundred parts of water; suffer the vessel to rest, and pour off the liquor when cold. Boil the remainder in seventy parts of water, and again pour off the cold liquor. Evaporate the mixed liquors to one-half, filter them through paper, and to the liquors, when cold, gradually add the Muriatic Acid. Lastly, having decanted off the supernatant fluid, dry with a gentle heat the residual powder, previously washed with a small quantity of cold water; pass it into a proper vessel, and with a slow fire sublime the Benzoic Acid.

REMARKS.—The process here given is nearly that of the Swedish chemist Scheele. The Benzoic Acid is separated from the resinous part of the Benzoin by Lime, with which it forms a very soluble compound. Muriatic Acid, added to the solution of Benzoate of Lime, forms Muriate of Lime, which remains in solution, and the Benzoic, displaced by the Muriatic Acid, having little solubility in water, gradually subsides, and by washing with water is partially freed from adhering Muriate of Lime. To purify it completely from saline and extractive

matter, sublimation is performed, which produces crystals of a brilliant silky appearance, and almost snowy whiteness.

To ascertain the comparative merits of the processes directed by the London, Edinburgh and Dublin Colleges, these processes were repeated. The result was, that the process of the London College, which is that of Scheele, gave an acid of much greater whiteness and purity than that obtained either by Carbonate of Soda according to the Edinburgh process, or by simple sublimation according to the process of the Dublin Pharmacopœia of 1807. The process of Scheele, here adopted, appeared also the most productive: for these reasons it was preferred. It is highly probable that Gum Benzoin, in different specimens, varies in its quantity of Benzoic Acid: this will account for the varying results of different experimenters on the quantity of acid obtainable from Benzoin.

The acid obtained by the process of the Dublin Pharmacopœia has much less of the smell peculiar to Benzoin than the acid afforded by exposure of Benzoin to heat. This, however, may not be an advantage, as the medical virtues attributed to this acid may arise chiefly from the adhering essential oil, from which the smell is derived.

PROPERTIES, AND TESTS OF ITS PURITY.—When pure, on exposure to heat, it fuses and evaporates with little change. It is inflammable, and burns without leaving a residuum. It is sparingly soluble in cold water, but dissolves in 24 times its weight of boiling water. It dissolves also in Alcohol, strong sulphuric and nitric acids, and is separated from them by water.

USES.—*Pharmaceutical*. It is used in the preparation of the Camphorated Tincture of Opium or Paregoric Elixir. —*Medicinal*. Not used in Medicine in its detached state. It is stimulant, as its sensible qualities indicate, and is supposed to be expectorant.

DOSE.—May be stated at from 3 to 20 grains.

CITRIC ACID.

Take of Lemon Juice as much as may be required,
Prepared Chalk, what may be sufficient.

To the Lemon juice, previously heated, gradually add the chalk, then pour off the liquor from the residual Citrate of Lime. Wash this repeatedly with warm water, and dry it. To the dried powder add the Diluted Sulphuric Acid, in weight equal to eight times the chalk employed. Boil the mixture, and using strong pressure, strain it through a linen cloth, and then filter through paper. Evaporate the liquor, that crystals may form by cooling. These, by repeated solution and crystallization, will become more pure.

REMARKS.—Lemon juice consists of Citric Acid united to water, vegetable mucilage, and some of the parenchymatous parts of the fruit. The latter ingredients prevent the acid, when concentrated by heat, from forming crystals. To detach these impurities from the acid, and to obtain it in crystals, is the intention of the above process. For this purpose the acid is united to Lime, by adding to the Lemon Juice Carbonate of Lime, in quantity sufficient for neutralization, which is determined by the mixture ceasing to effervesce when fresh Carbonate of Lime is added, and by applying the test of Litmus paper. Mr. Phillips found that a pint of Lemon Juice, weighing 15 ozs. $6\frac{1}{2}$ drs. will decompose a little more than 6 drs. of Chalk: half an ounce measured of Lemon Juice of the same strength, will therefore decompose 11.25 grs. of Chalk, equivalent to 32.4 grs. of Crystallized Carbonate of Soda. In an experiment, made with care by the writer, half an ounce measured of fresh Lemon Juice, of specific gravity 1036, at temperature 70° , neutralized

31.8 grs. of Crystallized Carbonate of Soda, a result agreeing very nearly with that of Mr. Phillips. It is evident, from these experiments, that in the ordinary form for preparing what is called the *saline effervescing draught*, the Lemon Juice and Carbonate of Soda, when directed in the quantity of half an ounce of the acid to half a drachm of the Salt, are nearly in correct proportion as determined by experiment; the excess being very little on the side of the Lemon Juice, consequently producing a mixture more palatable than if the Alkali were to predominate; also making allowance for varying quantities of acid, in different specimens of Lemon Juice.

The Sulphuric Acid detaches the Citric Acid from the Lime, forming Sulphate of Lime, from which the Citric Acid is separated by washing the mixture with water, the greater part of the Sulphate of Lime remaining undissolved. From the watery solution of the Citric Acid, by cautious evaporation, the acid may be obtained in crystals.

In this process the Sulphuric Acid should be sufficiently diluted with water, and also well mixed with the Citrate of Lime. The Citric Acid dissolves Citrate of Lime, the presence of which interferes with the crystallization of the Citric Acid; the separation of the lime may be effected by cautious addition of Sulphuric Acid. The evaporation of the Citric Acid should be carefully watched when approaching the point at which a pellicle forms on its surface, as an increase of the heat, or its continuance at this time, will cause the acid to become black. From the mother liquor of the crystals, which is of a brown colour and impure, more pure crystals may be obtained by a second neutralization with chalk, by treatment as before with Sulphuric Acid and water, with subsequent evaporation. Filtration through prepared

Charcoal will also promote the depuration of this liquor.

The decomposition in this case, and proportional quantities of the different ingredients of the mixture, are expressed in the following scheme :

Materials.

1 Citric Acid	= 58	1 Sulphuric Acid	= 40
1 Lime	= 28	2 Water	= 18
	—		—
1 Citrate of Lime	= 86	1 Sulphuric acid + 2 water	= 58

Products.

1 Citric Acid	= 58	1 Sulphuric Acid	= 40
2 Water	= 18	1 Lime	= 28
	—		—
1 Crystallized Citric Acid	= 76	1 Sulphate of Lime	= 68

This statement is founded on the supposition that the whole of the Citric Acid can be obtained in crystals, which in practice is nearly impossible.

PROPERTIES, AND TESTS OF ITS PURITY.—Citric Acid should be free from colour. Its solution in water should not become turbid when mixed with Muriate of Baryta, nor afford a precipitate with a Salt of Potash in watery solution, slowly added to it; the first of these tests detecting the presence of Sulphuric, and the last, that of Tartaric Acid. It should also remain transparent when neutralized with water of Ammonia, and then mixed with Nitrate of Lead.

USES.—*Pharmaceutical.* It may be used in place of Lemon Juice in preparing the Citrates of Potash, Soda, or Ammonia; and the numbers 144 and 76, representing the atomic weights of Carbonate of Soda and Citric Acid respectively, both in the crystallized state, water acidulated with Citric Acid, to have the neutra-

lizing power of Lemon Juice, should contain 33.7 grs. of crystallized Citric Acid in each ounce, or 540 grs. in the pint: as 32 grs. of crystallized Carbonate of Soda neutralize either half an ounce of fresh Lemon Juice, or 16.88 grs. of crystallized Citric Acid. If half an ounce measured of Lemon Juice, or its equivalent, 16.88 grs. of crystallized Citric Acid neutralize 32 grains of crystallized Carbonate of Soda, it will neutralize of the different alkaline compounds formed with Carbonic Acid, the following quantities:

	grs.
Of Sesquicarbonate of Soda	18.4
Carbonate of Potash	15.5
Bicarbonate of Potash	22.4
Sesquicarbonate of Ammonia	13.
Bicarbonate of Ammonia	17.5

The above numbers, bearing to each other the same proportion as the quantities of these Salts, each containing one atom of its respective Alkali.

USES.—*Medicinal.* Dissolved in water, it forms a grateful refrigerant drink, and may be given in febrile complaints with advantage. The addition of some Lemon Peel, or of a minute quantity of the essential Oil of Lemons, will impart to the mixture the flavour of the drink which is prepared with fresh Lemon Juice. The solution of the salt which Citric Acid forms, when it is united to Soda or Potash, has long been acknowledged as a useful remedy in inflammatory fever, under the name of the febrifuge draught of Riverius; and this draught, taken at the instant of its formation by union of the acid and alkali and whilst effervescing from the escape of Carbonic Acid Gas, is found to exert a powerful effect in preventing nausea and vomiting, and seldom fails to palliate or remove these symptoms when occurring in the course of fever. Its effects may depend on a sedative

action exerted by the Carbonic Acid on the stomach, together with the excitement given to the intestines and urinary organs.

DOSE.—Of the Crystallized Citric Acid, from 10 grs. to 2 drachms, properly diluted.

USES.—*General.* It is used by dyers for giving a lively tint to certain colours. With grain Tin it is said to form a liquor which, with Cochineal, imparts to Silk or Morocco Leather, a scarlet colour more brilliant than that given by the ordinary dye. It removes iron moulds from linen. Lemon Juice is sold in large quantities for the use of the calico printers: good juice, according to the late Mr. Parkes, should have a specific gravity between 1.0312 and 1.0625; and when its specific gravity falls so low as 1.0156, it is good for nothing.

MURIATIC ACID.

Take of dried Muriate of Soda, one hundred parts,
Sulphuric Acid of commerce, eighty-seven parts,
Water, one hundred and twenty-four parts.

Mix the acid with one-half of the water, and when the mixture has cooled, pour it on the Muriate of Soda previously introduced into a glass retort; pass the remainder of the water into a receiver so connected with the retort as to absorb the elastic fluid which comes over.

Distil the liquor until the residuum in the retort is made dry.

REMARKS.—Dried Muriate of Soda, according to modern chemical views, is a compound of Chlorine and Sodium, or a Chloride of Sodium. When water is applied, by transfer of the principles of the water to the

Chlorine and Sodium, it becomes Muriate of Soda, or a compound of Muriatic acid and Soda, from which the Sulphuric Acid disengages the Muriatic Acid. The latter would escape in the gaseous form but for the water with which it combines and forms liquid Muriatic Acid. Here it may be observed, that when it is desirable to obtain pure Muriatic Acid, the water passed into the receivers, should be distilled water.

The following scheme represents the atomic quantities of materials and products in this process:

Materials.

1 Chlorine	= 36	1 Sulphuric Acid	= 40
1 Sodium	= 24	1 Water	= 9
<hr/>		<hr/>	
1 Chloride of Sodium	= 60	1 Oil of Vitriol	= 49
		8 Water	= 72
		<hr/>	
		Diluted Sulphuric Acid	= 121

Products.

1 Sulphuric Acid	= 40	1 Muriatic Acid	= 37
1 Soda	= 32	8 Water	= 72
<hr/>		<hr/>	
1 Sulphate of Soda	= 72		109

The liquid Muriatic Acid thus formed, would have the specific gravity of 1162, according to the table of Dr. Thomson, as given in his First Principles of Chemistry, vol. 1. p. 87.

Various experiments were made by the writer on the decomposition of Muriate of Soda, and quantity of product which it affords. It was first ascertained that pure Muriate of Soda could be completely decomposed by Sulphuric Acid. For this purpose some pure crystals of Muriate of Soda, prepared with care, were exposed to a low red heat till they began to fuse. To a known weight of this salt, dissolved in water, a quantity of Sulphuric

Acid, purified by distillation, more than equivalent to the base of the salt, was added; the mixture evaporated to dryness, and heat applied until all fumes ceased to rise, the residuum appeared dry, and the salt began to fuse. To this, dissolved in a large quantity of water, an aqueous solution of Nitrate of Silver was added, by which a faint turbidness only was produced. Thus it was proved that a separation, nearly complete, of Muriatic Acid from Muriate of Soda, may be effected by Sulphuric Acid aided by heat.

To determine the quantity of Sulphuric Acid requisite for the decomposition of Muriate of Soda, 100 grs. of pure crystals of this salt were taken, 100 grs. of pure Sulphuric Acid added, and the Muriatic acid expelled from this mixture by heat, the residuum was dissolved in water, and water of Baryta gradually added, until neutralization, determined by test paper, was effected: the quantity of Sulphate of Baryta thus formed, when dried and weighed, indicated an excess of 19.4 grs. of Sulphuric Acid, leaving 80.6 grs. of strong liquid Sulphuric Acid, or Oil of Vitriol, requisite for the decomposition of 100 parts of dry Chloride of Sodium. The quantity, as determined by reference to the Atomic Theory, should be 81.6 parts. On trial, however, it was found that the complete decomposition of the Muriate of Soda was not effected by the above mentioned comparative quantities of acid and salt, but that more Sulphuric Acid was required for the same quantity of Muriate of Soda. In one experiment, dried Muriate of Soda, dissolved in water, was mixed with strong, pure, and fresh boiled Sulphuric acid, in the quantity indicated by reference to Dr. Wollaston's scale of chemical equivalents, or 83.7 of Sulphuric acid to 100 of dry Muriate of Soda: the mixture was evaporated to dryness, and the residuum made nearly red hot in a platina capsule. It still contained Muriatic Acid, the presence of which was ascer-

tained by dissolving the salt in water, and adding solution of Nitrate of Silver, by which a considerable turbidness was produced. To determine, from the last experiment, the exact quantity of Sulphuric Acid required for a certain quantity of Muriate of Soda, the quantity of Muriatic Acid remaining in the residuum was ascertained by collecting the precipitated Muriate of Silver, drying and weighing it, and from its weight inferring that of the Muriate of Soda in excess, which the Sulphuric Acid employed, was insufficient to decompose. From this experiment it was inferred, that 100 parts of Chloride of Sodium, or dry Muriate of Soda, require 87 parts of strong Sulphuric Acid for complete decomposition.

The following is a comparative view of the results of five, selected from several other experiments, made to determine the quantities of acid and water applicable to the complete decomposition of Chloride of Sodium, and so adjusted as to afford Muriatic Acid of specific gravity, 1160.

Expts.	Dried Sea Salt.	Sulphuric Acid, sp. grav. 1850.	Water.	Muriatic acid products.	Equivalent quantity of sp. grav. 1160.
1	5000	grs. 5000	grs. 8000	grs. 11430 of sp. grav. 1130	grs. 9389
2	5000	4180	8153	11390 of sp. grav. 1130	9356
3	5000	4190	8153	10950 of sp. grav. 1135	9280
4	5000	4190	6205	9130 of sp. grav. 1158	9024
5*	5000	4340	6200	7950 of sp. grav. 1160	7950

* In the last experiment, we must conclude, either that the heat was not continued for a sufficient time to expel all the Muriatic Acid, or that an increased

From the preceding experiments, it is evident that the large quantity of Sulphuric Acid affords most Muriatic acid; and that acid of specific gravity 1160, may be obtained by using water in the proportion given in the two last experiments. Still further, combining the results of the above experiments with those previously mentioned, it follows, that at least 87 parts of Sulphuric Acid are required for the complete decomposition of 100 parts of dry Sea Salt. Specific gravity 1160 was chosen for the Muriatic Acid, it being the medium density at which this acid is obtained; it is also the density given in the London Pharmacopœia, with which it is desirable to preserve uniformity where this can with propriety be obtained. It follows also, from the above experiments, that 100 parts of dried Sea Salt will, on an average, yield 185 parts of liquid Muriatic Acid, of specific gravity 1160. Of this acid, 101.1 parts are equivalent, in quantity of acid, to 100 parts of acid of specific gravity 1162, which consists of one atom of acid united to eight atoms of water. It is also evident, that a quantity of Muriatic Acid of specific gravity 1160, even exceeding that which theory assigns, and which should be about 183 parts from 100 of Chloride of Sodium, was obtained, and that the greatest quantity was yielded where the Sulphuric Acid was in excess.

In preparing the materials for this process, the Sulphuric Acid and water should be cautiously mixed, by adding the acid gradually to the water; and a glass vessel should not be used for containing the mixture, as the sudden increase of temperature caused by union of the acid and water, may break the vessel. The Liquid Muriatic Acid of Commerce has generally a yellow tinge, being distilled from an iron vessel, for the Permuriate of Iron rises with the Muriatic acid. The Acid obtained by

quantity of water aids the decomposition of Muriate of Soda by Sulphuric Acid, an opinion which the experiments given at pages 37, 38 appear to warrant.

the process of the Pharmacopœia in glass vessels, will be free from colour in proportion to the purity of the sea salt, which from its being prepared in iron pans contains variable small quantities of Oxide of Iron. Should any nitrate be present in the salt, this will afford chlorine, in combination with the product ; the Nitrate may be decomposed by heating the sea salt to fusion.

In this distillation, the fire should be managed with caution, as the materials are apt to swell up in the retort, and if this is not sufficiently large, to pass over into the receiver.

At the commencement of this process, the pure acid in the gaseous form predominates in the product, and if water were not present to absorb it, would escape ; hence it is expedient to divide the water into two portions ; to mix one with the Sulphuric Acid, and to pass the other portion into the receivers to absorb the gas. The water in that receiver which merely absorbs the acid gas, and is not mixed with the liquid acid which has dropped from the beak of the retort, is often the strongest part of the product.

The extrication of acid in the gaseous form from the materials, takes place after these have become dry in the retort ; and the distillation should be continued so long as an increase of density can be observed in the fluid of the receivers. This increase of density may be ascertained by placing behind the glass receiver a luminous object, and looking toward it through the liquid, when dense striae will be seen descending from the surface, so long as the absorption of acid gas continues.

Dr. Perceval, late Professor of Chemistry in the University, observed, that if we divide the acid product obtained at different periods of the process into three portions, the first and third portions have the greatest, and the middle portion the least density. This is caused

by the product of gas or pure acid predominating at the commencement and end of the process.

PROPERTIES, AND TESTS OF ITS PURITY.—It should be colourless. When strong it generally has a slight tinge, which can only be avoided by using pure materials. It should emit greyish white fumes pretty copiously when exposed to air; this affords a coarse test of its strength, for when it is below 1130 in specific gravity, it does not fume on exposure to air. Its specific gravity should be 1160. When sufficiently diluted with water it should not become turbid when mixed with a solution of Muriate of Baryta; and a few drops of it evaporated from a capsule of glass or platina should leave no residue. Gold leaf should remain unchanged when immersed in this acid. Thus the presence of water, Muriate of Soda, or any saline matter fraudulently added for the purpose of increasing its density, and of Sulphuric and Nitric Acids, is detected.

The following table, calculated by the writer from one formed by Dr. Ure, and differing inconsiderably from a table constructed by Mr. E. Davy, Professor of Chemistry to the Royal Dublin Society, is sufficiently extended for all practical purposes, and shows the quantity of pure acid in 100 parts of the liquid acid at different specific gravities. By subtracting 1·37th part from each of the numbers expressing the quantity of Muriatic Acid Gas, the difference gives the corresponding quantity of Chlorine.

100 parts of Liquid Muriatic Acid at specific gravity.	Muriatic Acid Gas.
1170 . . . contain . . .	34.23
1160	32.23
1150	30.29
1140	28.35
1130	26.35
1120	24.35
1110	22.38
1100	20.38
1090	18.37
1080	16.35
1070	14.33

USES.—*Pharmaceutical.* It is applied in the preparation of the diluted Muriatic Acid; Nitro-muriatic Acid; Prussic Acid; Muriate of Baryta; precipitated Phosphate of Lime; Nitro-muriatic Oxide of Antimony; and liquor of Muriate of Iron.

—*Medicinal.* Largely diluted with water it is sometimes given in the treatment of fever, as a refrigerant and antiseptic drink. It is also added to gargles used in ulcerated sore throat. Taken internally in doses of from five to twenty-five drops, it is considered beneficial in those kinds of urinary calculus which are caused either by Phosphate of Lime or by Ammoniacal Phosphate of Magnesia, and in such cases it has been supposed either to enter the bladder and exert its action directly on the calculus or to obviate the tendency in the constitution to produce calculous matter.

Given in doses of from ten to twenty drops diluted with water or any other mild fluid, it is found to improve the appearance of venereal ulcers. It is also a valuable remedy in ulceration of the gums, and may be used diluted with water and combined with the Mel Rosæ of the Pharma-

copœia. It is said to prevent the generation of worms when given after copious evacuation of the bowels. It was recommended in the year 1773, by Guyton de Morveau, for the purpose of correcting putrid miasmata. To be thus applied, it should be disengaged from dry Sea Salt by strong Sulphuric Acid, and the infected apartments filled with the vapours of the Gas. In these countries fumigation with Nitric Acid vapours, or with Chlorine, is generally preferred; but such modes of disinfection ought not to supersede free ventilation and cleansing.

Should Muriatic Acid, swallowed by accident or design, have acted as a poison, its presence in the fluids of the stomach may be detected, by passing a small quantity of the fluid into a flask or matrass with a curved tube fitted to it, and having immersed the extremity of the tube in a glass containing Nitrate of Silver slightly acidulated by Nitric Acid, by applying heat to the bottom of the matrass, and causing the disengaged vapour to pass through the solution of Nitrate of Silver: should Muriatic Acid be present, the solution of silver will be made turbid by the formation of Chloride of Silver. The proper antidotes in this case would be copious dilution, Carbonate of Magnesia, and, if necessary, washing the stomach by means of the stomach pump.

USES.—*General.* In chemical analysis, the liquid Muriatic Acid is much employed for dissolving various earthy and metallic compounds. In the preparation of Nitro-muriatic Acid used to form the mordant for scarlet, and as a solvent of gold and platina it is also employed. It is likewise applied in the process of tinning sheet iron, for cleansing the iron plate previous to its immersion in the melting tin.

DILUTED MURIATIC ACID.

Take of Muriatic Acid, *by measure*, ten parts,
Distilled water; *by measure*, eleven parts.—Mix.

The specific gravity of this acid is to that of distilled water as 1080 to 1000.

REMARKS.—The strength of the Diluted Acid of this Pharmacopœia was made to correspond with that of the edition of 1807. An experiment was carefully made to determine the quantities of Muriatic Acid, specific gravity 1160, and of water capable of producing a mixture of specific gravity 1080, when it was found that a mixture of this density was obtained by the acid and water mixed in the proportion here directed, or by ten parts of Muriatic Acid with eleven parts of water, each taken by measure.

This is a convenient form of the acid for medical use. It does not emit fumes. It can be easily kept. It does not by the expansion of the escaping gas force out the stoppers of the bottles which contain it, and diffuse its vapours, causing much inconvenience by tarnishing or rusting all iron or steel instruments. Its dose can also be more easily determined than that of the strong acid.

USES.—*Pharmaceutical*. It is employed in the preparation of the *Calcis Phosphas Præcipitatum*.

—*Medicinal*. It is applied to the same purposes as the stronger acid, and of course in larger dose.

DOSE.—From ten to fifty grains *by measure*.

NITRIC ACID.

Take of Nitrate of Potash one hundred parts,
Commercial Sulphuric Acid ninety-seven parts.

Mix in a glass retort, and with an apparatus adapted to collecting the acid products, distil until the residuum in the retort shall concrete and again become liquid.

REMARKS.—In this process, by the superior attraction of Sulphuric Acid, the Nitric Acid is detached from the Potash of the Nitre, and volatilized by heat it rises from the mixture and passes over into the receiver. Bisulphate of Potash remains in the retort. In this case the atomic quantities of materials and products are:

Materials.

1 Nitric Acid	= 54	2 Sulphuric Acid	= 80
1 Potash	= 48	2 Water	= 18
	—		—
1 Nitrate of Potash	= 102	2 Liquid Sulphuric Acid	= 98

Products.

2 Sulphuric Acid	= 80	1 Nitric Acid	= 54
1 Potash	= 48	2 Water	= 18
	—		—
1 Bisulphate of Potash	= 128	1 Liquid Nitric Acid	= 72

In this case the water of the liquid Sulphuric Acid, passing to the Nitric Acid, renders it weaker than it would be if the quantity of Sulphuric Acid employed were smaller, as in the process of the former Dublin Pharmacopœia of 1807: but when the quantity of liquid

Sulphuric Acid equivalent to one atom only is used, the acid obtained is always deep coloured, containing much Nitrous Acid; for it is extremely probable that pure Nitric Acid cannot exist in the liquid state without two atoms of water. Several inconveniences result from the use in this process of Sulphuric Acid in the quantity of one proportional only; one of these is, that toward the conclusion of the distillation, when the acid passing over from the materials is small in quantity and very dense, this acid receives such an increase of temperature as to be resolved into its elementary constituents, and a considerable quantity of a gas, containing a large proportion of Oxygen Gas is disengaged; an effect apparently arising from the same cause as that which occasions the decomposition of Nitric Acid when made to pass through a porcelain tube heated to redness. This decomposition does not take place when the double proportion of Sulphuric Acid is employed. Another inconvenience attending the process of obtaining the Nitric Acid by a quantity of Sulphuric Acid less than that which corresponds with two atoms of the acid to one of nitre, is, that the residual Sulphate of Potash becomes so hard on cooling that it can scarcely be removed without breaking the retort: the cost of a retort must in this case be added to that of the process, and this will much exceed the cost of an additional quantity of Sulphuric Acid, by which a Bisulphate of Potash would be left in the retort of a soft texture and easily removable by hot water.

Numerous experiments were made by the writer on the production of Nitric Acid from Nitre by Sulphuric Acid. A tabular view of some of the most satisfactory of these results is here given.

Expt.	Nitre.	Sulphuric Acid.	Nitric Acid product.	Equivalent quantity of Nitric Acid of spec. grav. 1500.	Residuum.
1	grs. 5000	grs. 3333	grs. 2670 of spec. grav. 1505 and 1934 of spec. grav. 1188.	grs. 3406	grs. 5003
2	5000	5000	3366 of spec. grav. 1490 and 1270 of spec. grav. 1045.	3326	6480
3	5000	4850 + water = 859 grs.	4270 of spec. grav. 1428 and 970 grs. of spec. grav. 1005.	3318	6366
4	5000	4850 + water = 1850 grs.	5240 of spec. grav. 1365 + 970 grs. of spec. grav. 1010.	3343	6320

The acid obtained in the first experiment was of a deep orange colour, water was passed into one of the receivers to absorb any of the acid which might come over in form of gas or vapour. This will account for the excess in the quantity of product compared with that of materials. The nitre used in the above experiments was purified by recrystallization, and well dried. The Sulphuric Acid was also purified by distillation, and concentrated by boiling. In the two last experiments

water was added to the Sulphuric Acid, for the purpose of observing its effect in diminishing the production of orange coloured vapours arising from decomposition of some of the Nitric Acid. This effect it was found to produce; the distillation also proceeded more rapidly: but the advantages here gained were not deemed sufficient to compensate for the diminution in density of the acid product. In all these experiments the heat was applied until all vapours ceasing to appear, the residuum in the retort had become perfectly liquid and the bottom of the sand pot red hot. No vapours of Sulphuric Acid were observed to rise, nor was any of this acid found in the product of Nitric Acid.

From the preceding experiments it follows that 5000 parts of Nitre afford a quantity of Nitric Acid equivalent, on an average, to 3348 parts of the acid, having the specific gravity of 1500; or 100 parts of nitre yield very nearly 67 parts of such acid, or 70 parts of Nitric Acid of specific gravity 1490, and a residuum of Bisulphate of Potash amounting to 120.8 parts.

PROPERTIES AND TESTS OF ITS PURITY.—It emits white fumes on exposure to air. It is very corrosive, and stains the skin with a yellow tinge. With Nitrate Muriate or Acetate of Baryta it should give no turbidness. In the application of these tests of Sulphuric Acid, as strong Nitric Acid always causes a turbidness in aqueous solutions of the Salts of Baryta, by abstracting the water which held the salt in solution, the Nitric Acid should either be diluted with about its own bulk of water before the barytic solution is added, or when the mixture is formed and has become turbid, the addition of water will ascertain whether the turbidness has arisen merely from abstraction of water, or from the presence of Sulphuric Acid; in the former case, when the water is added the turbidness will disappear; in the latter, it will be permanent. With Nitrate of Silver also, it should not become

turbid, as takes place when Muriatic Acid is present. The Chloride of Silver, formed in this case, is recognized by its becoming of a purplish brown colour on exposure to light, and dissolving completely in water of Ammonia. Muriatic Acid is the most common impurity, and is generally found in the Nitric Acid of Commerce, owing to the presence of a small quantity of Muriate of Soda in the nitre. This might be obviated by using nitre purified from Sea Salt. But as it is somewhat difficult either to obtain or to prepare this purified nitre, the acid may be freed from Muriatic Acid by adding a little of an aqueous solution of Nitrate of Silver, when the mixture will become turbid from production of Chloride of Silver, which will gradually subside from the Nitric Acid: the clear supernatant acid liquor, previously tested with a little of the Nitrate of Silver; for the purpose of ascertaining that a sufficient quantity of the nitrate was added, should then be poured off and re-distilled to free it from any excess of Nitrate of Silver, when it will be obtained detached from Muriatic Acid. The addition of Nitrate of Baryta and a second distillation will also free it from Sulphuric Acid; but this is rarely or never present in the Nitric Acid prepared by the process of this Pharmacopœia. From Nitrous Gas it may be purified, and rendered colourless by heating it to ebullition.

USES.—*Pharmaceutical.* It enters the composition of the diluted Nitric Acid and Nitro-muriatic Acid. It is used in preparing, the Nitro-muriatic Oxide of Antimony; Nitrate of Silver; Subnitrate of Bismuth; Nitric Oxide of Mercury; Persulphate of Mercury; Precipitated Calomel; Acetate of Mercury; Nitrous Ether; Ointment of Nitric Acid, and Ointment of Nitrate of Mercury.

—*Medicinal.* It is given internally as a tonic, and is supposed to have considerable efficacy in restraining the progress of Syphilis. With this intention it was

first given by Dr. Scott of Bombay, who found that its action on the human system resembled that of mercury, in producing soreness of the gums and salivation. That it is useful in restraining the progress of venereal ulceration, and restoring the strength, when broken down by the use of mercury, is certain, although it will not effect a radical cure of Syphilis. In some liver diseases, as these appear in India, it is deemed beneficial, and given much diluted with water, so as to form an acidulous drink, it was found useful by Dr. Duncan in the low typhous fevers that occasionally prevail in the suburbs of Edinburgh.

Its fumes disengaged from nitre by strong Sulphuric Acid, are supposed efficacious in destroying the contagious effluvia of typhus or other febrile diseases. Dr. Carmichael Smith received from the British Parliament £5000 for the introduction of this mode of disinfection. It may be put in practice by passing into a flat earthen vessel, placed in hot sand, half an ounce of Nitre reduced to powder, and pouring on this about half its weight of strong Sulphuric Acid or Oil of Vitriol; the nitrous fumes are immediately disengaged, and are not so offensive to the inmates of the dwelling as other vapours are, more especially those of Chlorine. Dr. Duncan asserts, in his last valuable edition of the Edinburgh Dispensatory, that the above mentioned quantities of Nitre and Sulphuric Acid will fill with vapour a cube of ten feet; therefore by increasing, in proportion to the size of the room, the number of vessels containing the fumigating materials, the acid vapours may be completely diffused through every part of the open space of an apartment, but unless with particular care, the fumes can scarcely be brought into contact with clothes shut up in drawers or boxes, or with the interior of bedding, and to such articles contagion is supposed, and with a high degree of probability,

to adhere. That the vapours of Nitric Acid, as some physicians have supposed, are altogether inefficacious, can scarcely be admitted when we bring to mind that infectious effluvia are probably, in composition, similar to other animal substances, and on these Nitric Acid has a powerful action, and completely alters their chemical qualities. But although we should concede to nitrous fumigation the power of diminishing contagion, its superiority over ventilation and cleansing is by no means established, and it should not supersede the use of these preventives when practicable. Nitric Acid has been used as an escharotic, and proposed as a good application to the part bitten by a rabid animal, with the intention of destroying the animal texture and altering the poison: whether this practice should be preferred to excision, experience alone can decide, for on its first application it may accelerate the absorption of the poison, and in this respect prove rather injurious than serviceable.

DILUTED NITRIC ACID.

Take of Nitric Acid, *by measure*, three parts,
Distilled Water, *by measure*, four parts.

Mix, avoiding the noxious vapours.

The specific gravity of this acid is to that of distilled water as 1280 to 1000.

REMARKS.—To prevent mistakes in apportioning its dose, the diluted Acid is made of the same strength as

the acid of the Dublin Pharmacopœia of 1807. According to the tables of Dr. Ure, as given in his Dictionary of Chemistry, p. 58, diluted Nitric Acid composed as above, has a specific gravity somewhat exceeding 1280, or approaching nearly to 1300: but the closest approximation to the acid of required strength, by measured quantities expressed in the lowest terms, is obtained by a mixture prepared according to the process as above given in the new Dublin Pharmacopœia.

The diluted Nitric Acid is used for the same purposes as the stronger acid, but is preferred to the latter, being more manageable, and its dose more easily determined than that of the dense acid. Accordingly in those cases which indicate its internal use, the diluted Nitric Acid is employed.

It is to be regretted that the London College, in the last edition of their Pharmacopœia, have made so great an alteration in the strength of the diluted Nitric Acid, differing so much from that directed in the Pharmacopœias of Edinburgh and Dublin: the strength of these acids being nearly as the following numbers, which express the quantities of acid of specific gravity 1500, contained by 100 parts of each respectively:

Diluted Nitric Acid of London College,	..	14.2
Do. of Dublin do.	.. ...	.. 48 nearly
Do. of Edinburgh do.	.. ..	.. 50.

The diluted Acid of the Dublin and Edinburgh Pharmacopœias is therefore more than three times stronger than that of the London Pharmacopœia.

The following table, calculated from that given by Dr. Ure in his Dictionary of Chemistry, page 58, exhibiting the quantities of liquid acid, spec. grav. 1500, and of dry acid contained in 100 parts of the diluted Acid at different specific gravities, will be found sufficiently exact for all practical purposes.

100 parts of Nitric Acid of spec. grav.	Contain of Nitric Acid of spec. grav. 1500 parts by weight.	Contain of Dry Acid, parts by weight.
1500	100	79.7
1490	95.6	76.1
1480	92.3	73.5
1470	89	70.9
1460	86	68.5
1450	83	66.1
1440	80.3	64
1430	77.9	62
1420	75.2	60
1410	72.9	58
1400	70.5	56.1
1390	68.2	54.4
1380	66.3	52.8
1370	64.3	51.3
1360	62.4	49.7
1350	60.4	48.1
1340	58.4	46.6
1330	56.5	45
1320	54.7	43.5
1310	52.8	42
1300	51	40.5
1290	49.2	39.2
1280	47.5	37.9

The diluted Nitric Acid, considerably diluted with water, has been applied externally to ulcers with benefit.

DOSE.—From 10 grains to 40 grains *measured*, two or three times in the day.

NITRO-MURIATIC ACID.

Take of Nitric Acid, *by measure*, one part,
Muriatic Acid, *by measure*, two parts.

Mix the acids in a refrigerated bottle, and keep the mixture in a cold and dark place.

REMARKS.—This is the mixture formerly denominated Aqua Regia, from its property of dissolving gold.

Omitting part of the water, the following may be stated as the results of this operation :

Materials.

1 Nitrogen	= 14	1 Chlorine	= 36
5 Oxygen	= 40	1 Hydrogen	= 1
	—		—
1 Nitrous Acid	= 54	1 Muriatic Acid	= 37

Products.

1 Nitrogen	= 14	1 Oxygen	= 8	1 Chlorine	= 36
4 Oxygen	= 32	1 Hydrogen	= 1		
	—		—		
1 Nitrous Acid	= 46	Water	= 9		

Heat separates from this preparation its Chlorine, and therefore deprives it of that ingredient on which its chief properties depend. Light also enables Chlorine to decompound water, and might convert the Chlorine into Muriatic Acid. The bottle should be well stopped, as the products have a great disposition to assume the elastic form. For these reasons it is directed that the mixture should be kept in a cool and dark place, and in a well stopped bottle.

USES.—*Medicinal.* It was recommended by Dr. Scott, of Bombay, as an external application, for which purpose water should be acidulated with it, until the water has acquired a taste as sour as that of strong vinegar; this mixture should be applied, by means of a sponge, to the external surface of the body; or a bath should be prepared in which the feet and legs are immersed; this may consist of a narrow tub, holding three gallons of the water, acidulated with about nine ounces, by measure, of the diluted Aqua Regia, prepared by mixing the Nitromuriatic Acid with an equal measure of water. In this bath the feet should be kept immersed for twenty minutes or half an hour. In the winter the water should be warm: the body at the same time should be sponged with the diluted Aqua Regia. The bath may be employed at first daily for a fortnight or three weeks, and afterwards every other day, or only twice a week. The effects resulting from the use of this remedy are, a tingling sensation in the skin, thirst, a peculiar taste in the mouth: a peculiar action appears also to be exerted on the biliary secretion, and Dr. Scott has affirmed, that when employed during the passing of a gall-stone through the duct it operates like a charm, and produces immediate case.

USES.—*General.* It is used as a solvent for gold and platina. The dyers of scarlet also employ it in preparing their solution of tin, although it is formed not by the process of the Pharmacopœia, but by addition of Sea Salt to diluted Nitric Acid.

PRUSSIC ACID.

Take of Cyanuret of Mercury, an ounce,
 Muriatic Acid, *by measure*, seven drachms,
 Water, *by measure*, eight ounces.

Distil into a refrigerated receiver, eight ounces *by measure*, to be kept in a well corked bottle, in a cool and dark place.

The specific gravity of this acid is to the specific gravity of distilled water, as 998 to 1000.

REMARKS.—In this process the Cyanuret (or Cyanide) of Mercury is decomposed by the Muriatic Acid; the Hydrogen uniting with the Cyanogen, and changing it into Prussic Acid which rises and passes over into the receiver; the Corrosive Muriate or Chloride of Mercury remains in the retort, and as the residual liquor cools, deposits its usual spicular crystals. The changes which take place in this instance, and the atomic quantities transferred, are represented in the following scheme :

Materials.

1 Mercury	= 200	2 Chlorine	= 72
2 Cyanogen	= 52	2 Hydrogen	= 2
<hr/>		<hr/>	
1 Bicyanide of Mercury	= 252	2 Muriatic Acid	= 74

Products.

2 Cyanogen	= 52	1 Mercury	= 200
2 Hydrogen	= 2	2 Chlorine	= 72
<hr/>		<hr/>	
2 Prussic Acid Vapour	= 54	1 Bichloride of Mercury	= 272

On reference to the tables of Muriatic Acid, it will be found that 74 parts of Muriatic Acid Gas are contained in 229.8 parts of liquid Muriatic Acid, of specific gravity 1160; consequently 480 grs. or one ounce of Cyanuret (Bicyanide) of Mercury, will require 437 grs. of the same liquid Acid for complete decomposition, which is but a little less than the quantity directed in the Pharmaceutical process; the weight of 7 drs. by measure, of Muriatic Acid of specific gravity 1160, being 462.8 grs.

An experiment was made in which equal weights of Cyanuret (Bicyanide) of Mercury and Muriatic Acid were employed. The Prussic Acid yielded by this process reddened litmus paper, and gave a precipitate with solution of Nitrate of Silver. The quantity of Muriatic Acid used in the latter case, is more than sufficient for the decomposition of the Bicyanide of Mercury. The quantity of liquid Prussic Acid, formed by the process of the Pharmacopœia as above given, amounted to about 7 oz. 5 drs. It had the specific gravity of 998 and was consequently much diluted with water, which, with an agent of such great activity, is an advantage, as its dose can be apportioned with more exactness than if the acid were stronger. By several other processes it may be obtained of much greater strength, but no advantage is thereby gained, as it cannot be administered in the concentrated state, but must in every case be diluted. The main object is to obtain the whole of the Hydrocyanic Acid from the materials, and of a certain fixed strength, whilst the dilution with water assists the exact regulation of the dose.

TESTS OF ITS PURITY.—The pure liquid acid is limpid and colourless. It has a strong smell, which causes much irritation in the nostrils, with a peculiar sensation extending downwards into the trachea; and if inhaled incautiously, and in large quantity, producing giddiness or faintness. The latter effect is, however,

more likely to arise from a strong acid than from the dilute acid of this Pharmacopœia. Its taste is peculiar, resembling that of bitter almonds or laurel leaves. The attempt to taste it should be made with great caution, as it is a most active poison.

The specific gravity of water is diminished by absorbing Prussic Acid vapour, in which respect this acid resembles ammonia. Therefore specific gravity affords an estimate of its strength; the less the specific gravity the stronger the liquid acid. But according to the experiments of Dr. Ure, specific gravity is not a rigorously exact criterion of the strength of liquid Prussic Acid. He states that liquid acid at specific gravity 996, contains about double the quantity of real acid which it does at specific gravity 998. Dr. Ure proposes as a more accurate mode than specific gravity, for determining the quantity of real Prussic Acid in water, the use of the red Oxide of Mercury prepared by Nitric Acid; the *Nitric Oxide of Mercury* of this Pharmacopœia. To apply this test, some of the oxide should be reduced to fine powder, dried with a moderate heat, and about forty or fifty grains of this powder carefully weighed: one hundred grains, *by measure*, of this acid, of specific gravity previously determined, passed into a glass tube, and the pulverized red Oxide gradually added, which on agitation readily dissolves so long as any disengaged Prussic Acid is present; the difference in the weights of the residual red Oxide and of that originally taken, gives the weight of the portion dissolved by the Prussic Acid.

The real Prussic Acid, corresponding in quantity to the red Oxide of Mercury dissolved, is found by viewing the changes thus: a Bicyanide of Mercury is formed, as given in the preceding scheme; two atoms of the

Oxygen contained in the Peroxide of Mercury, uniting with two atoms of Hydrogen in the Prussic Acid to form water, and two atoms of Cyanogen with one of Mercury, to form Bicyanide of Mercury. Hence it follows, that every 216 parts of Peroxide of Mercury indicate 54 parts of Prussic Acid vapour, or that the Prussic Acid is exactly 1-4th of the weight of the Peroxide of Mercury, and therefore for every four parts of red Oxide of Mercury dissolved, one part of Prussic Acid existed in the liquor.

Dr. Ure observes that specific gravity is a criterion of greater nicety than can be conveniently used by the majority of practitioners, and he proposes to substitute for it the above application of Peroxide of Mercury. He has constructed a table, in which, as may be inferred, the quantity of real Prussic Acid contained in the strong Liquid Acid of specific gravity 9570, was ascertained by means of the Peroxide of Mercury; and with which strong acid, by addition of successive portions of water, mixtures of decreasing specific gravities, each containing the known quantity of real Prussic Acid, were prepared.

The following table is extracted from Dr. Ure's Dictionary, p. 74.

Quantity of Liquid Acid, spec. grav. 957 in 100 parts of mixture.	Specific Gravity.	Real Acid per cent.
100.0	0.9570	16
66.6	0.9768	10.6
57.0	0.9815	9.1
50.0	0.9840	8.0
44.4	0.9870	7.3
40.0	0.9890	6.4
36.4	0.9900	5.8
33.3	0.9914	5.3
30.8	0.9923	5.0
28.6	0.9930	4.6
25.0	0.9940	4.0
22.2	0.9945	3.6
20.0	0.9952	3.2
18.2	0.9958	3.0
16.6	0.9964	2.7
15.4	0.9967	2.5
14.3	0.9970	2.3
13.3	0.9973	2.1
12.5	0.9974	2.0
11.8	0.9975	1.77
10.5	0.9978	1.68
10.0	0.9979	1.60

The Prussic Acid of this Pharmacopœia should have the sensible qualities above described, and 100 parts of it, by weight, should dissolve a little less than 6.4 parts of red Oxide of Mercury, reduced to a fine powder; and therefore contain 1.6 of real Prussic Acid.

An exact mode of detecting small quantities of Prussic Acid is of great importance, more especially when the acid has acted as a poison. In water it may be detected, according to Dr. Ure's experiments, by making the liquid

containing the Prussic Acid slightly alkaline by Potash, adding a few drops of a solution of the Sulphate of Copper, and then sufficient Muriatic Acid to re-dissolve the excess of Oxide of Copper. The liquid will appear more or less milky, according to the quantity of Hydrocyanic (Prussic) Acid present. A quantity of this acid in water, not exceeding a 1-20,000th of the mixture, may be discovered by this test.

Should the Prussic Acid be contaminated by Muriatic Acid, which will happen if too much of the latter acid was used in the process of preparing the Prussic Acid; this can be ascertained by neutralizing the liquor with ammonia, and evaporating with a heat, at the end of the process not exceeding 212° . If Muriatic Acid was present, Muriate of Ammonia will remain.

Prussic Acid may be purified from Muriatic Acid, by adding a small quantity of Bicyanide of Mercury, and re-distilling the mixture.

USES.—*Pharmaceutical.* It is not applied to any pharmaceutical use, according to this Pharmacopœia. In the Parisian Codex medicamentarius, a syrup is directed to be prepared with Prussic Acid; but it seems injudicious to multiply preparations of a medicine so active as Prussic Acid.

—*Medicinal.* In the dilute state it is recommended as a remedy in Phthisis pulmonalis, and is reported to allay irritation and diminish the frequency of cough, but its curative efficacy in this disease is very doubtful. In simple dry cough, apparently connected with spasm, it is said to be beneficial, and accordingly it is found occasionally useful in spasmodic asthma. In whooping cough it also affords some relief. It has been reported to calm the irritability of the uterus even in cases of cancer, and to moderate the morbid activity of the heart; and it appears to have some specific action on mucous surfaces.

It may be useful here to advert to its poisonous qualities, for the purpose of reminding the prescriber of the great caution to be observed in the use of this remedy. When applied in its concentrated form to the tongue, fauces, eye, or even to the external surface, by spreading it over the skin, it acts as a most virulent poison; and in the quantity of one or more drops, varying with the strength of the acid, vigour of the individual, and his previous habits in respect to its use, it causes immediate death. A single drop of a very strong acid passed into the throat of a strong dog has caused it to drop dead, and an animal is instantly killed by drawing a feather dipped in the strong liquid acid across the eye ball. Scarcely any irritability can be detected in the muscles of animals poisoned by Prussic Acid. A sufficient dose of the more diluted acid of this Pharmacopœia would also be destructive of human life; the prescriber should immediately desist from its use when giddiness, vomiting, pain and sense of tightness at stomach, faintness, stupor, or sensations of weight at the top of the head comes on.

As remedies for the effects of this poison, when the quantity swallowed is small, Orfila recommends that full vomiting should be excited by twelve grains of Sulphate of Zinc, dissolved in a glass of water, or by three or four grains of Sulphate of Copper; then strong coffee, prepared by infusing for ten minutes a quart of boiling water on eight ounces of coffee, and then straining: three or four table spoonfuls of Oil of Turpentine mixed with the coffee, to be given at intervals of half an hour. If stupor and insensibility have come on, the immediate application of the stomach pump should be had recourse to.

DOSE.—From two or three drops to half a drachm, by measure. The smaller dose to be commenced with, and gradually increased, a sufficient time being suffered to elapse between each dose.

SUCCINIC ACID AND OIL OF AMBER.

Take of Amber reduced to a coarse powder,
Pure sand, of each one part.

On the application of heat gradually increased, an acid liquor, oil, and the acid in the crystallized form, will distil over. The latter should be received on bibulous paper, and exposed to strong pressure to expel the oil, and again sublimed. By filtration through bibulous paper the oil may be obtained separate from the acid liquor.

REMARKS.—When heat is applied to amber it fuses, the volatile parts containing the acid oil and water rise and pass over into the receiver. Sand is added, for the purpose of keeping separate the particles of the amber, and preventing their fusing into a solid mass from which the acid could with difficulty be disengaged by heat. In conducting this process the retort, with its neck and the receiver, should be capacious. The distillation should be conducted on a sand bath with a heat gradually increased until the bottom of the retort becomes red. The amber first gives over a watery fluid, then follows a clear oil slightly tinged of a yellow colour; and Carburetted Hydrogen, Carbonic Oxide and Carbonic Acid Gases are disengaged. The Succinic Acid appears even before the oil, and is sublimed in form of needles or of a crystalline crust lining the neck of the retort. From the beginning of the process an aqueous liquid comes over, which contains a little Succinic Acid, Acetous Acid, and Ammonia, according to Dr. John of Berlin. Should a considerable quantity of the Concrete Acid appear, this may be separated by the process above directed, otherwise the

product should be washed with distilled water, by which the acid will be dissolved. The writer has observed that the acid liquor and oil may be obtained separate, by a filter of bibulous paper moistened with water; as the watery portion holding the acid in solution will pass through, but the oil will remain on the filter, and may be poured off and preserved for rectification. By cautious evaporation of the acid liquor, the Succinic Acid is obtained in crystals, having the form of triangular prisms.

Some kinds of amber, according to Dr. John's observations, yield Succinic Acid in small quantity only, and afford no crystallized acid on distillation. From his experiments, it appears that 100 parts of the best amber afford of oil 75 parts; crystallizable acid 4; an acid watery fluid 7, and of carbonaceous residue from 7 to 8 parts: the deficiency arising from the production of the above mentioned gases.—See *Jolin's Naturgeschichte des Succins*. Hence it follows, that every hundred parts of amber yield about four of Succinic Acid. A portion of empyreumatic oil adheres to it even after repeated solutions and crystallizations; hence it is, that when neutralized by any of the alkalies, it affords a brownish coloured fluid.

The number representing the comparative weight of the atom of Succinic Acid, deduced from its combination with peroxide of iron, is 50.

PROPERTIES AND TESTS OF ITS PURITY.—It should completely dissolve in water; rise when heated, and evaporate without leaving a residue. Its solution in water should afford no precipitate with the soluble Barytic Salts; and carefully neutralized by Ammonia or the fixed alkalies, it should give a brownish red precipitate on adding to it a neutral solution of peroxide of iron. According to the experiments of Guyton de Morveau, it may be completely freed from adher-

ing essential oil, by mixing with it a small quantity of Nitric Acid, and by the repeated cohobation of the latter acid.

USES.—It is not applied to any Pharmaceutical use. It was supposed to possess some antispasmodic and diaphoretic powers, but these must be very feeble, as it is now very rarely used. When given internally, its dose is from five to twenty grains.

Dr. Duncan observes, that in the preparation of this acid from amber, the addition of sand, which is made for the purpose of preventing the amber from running together when the heat is applied to it, unfits the residue for the uses of the varnish maker.

PURE SULPHURIC ACID.

Take of Commercial Sulphuric Acid, a pound.

Pass the acid into a retort of flint glass, attach a receiver of the same kind, and with the junctures of the vessels left open, let heat be applied to the retort until one-twelfth part of the liquor shall have distilled over: this, as it contains water, should be rejected. The receiver being again applied, the residuum is to be distilled to dryness.

A few slips of Platina passed into the acid in the retort, will restrain the ebullition, which otherwise would be too violent.

The specific gravity of this acid is to the specific gravity of distilled water as 1845 to 1000.

Let the acid be kept in well closed vessels.

REMARKS.—The oil of vitriol of commerce, or commercial Sulphuric Acid, from which the above preparation is

obtained, from the mode of its preparation by burning a mixture of Sulphur and Nitre in a large chamber lined with lead, is always contaminated by Sulphate of Lead and Sulphate of Potash, the quantity of these impurities amounting not unfrequently to three or four in the hundred parts of acid. From these impurities it is effectually separated by distillation; the acid rising on application of sufficient heat, passing over into the receiver, and leaving the fixed salts in the retort. It also contains water.

This operation requires much caution, as when the acid boils, violent concussions, occasioned by the sudden evolution of a large quantity of acid vapour, and its instantaneous condensation, take place within the retort, and expose it to the hazard of being broken. This sudden evolution and condensation of Sulphuric Acid vapour is attributed to its low capacity for heat; therefore a small addition of heat to the acid brought to its boiling point, occasions the production of much vapour, and a small abstraction of heat as rapidly condenses this vapour into liquid acid. Slips of platina foil passed into the retort, as directed in the above process, greatly diminish this inconvenience, by causing the bubbles of vapour to rise in a small and continued stream from the bottom of the retort. The action appears to be merely mechanical, and to arise from the bubbles of vapour being broken by the platina at the instant of their formation. This effect of the platina was first noticed by M. Gay Lussac. A similar action is produced by slips of glass substituted for the platina foil, but the effect, according to the writer's experience, is incomplete, probably because the glass is lighter than platina.

Pure *liquid* Sulphuric Acid is thus composed:

1 Sulphur	=	16
3 Oxygen	=	24
1 Water	=	9
		—
1 Liquid Sulphuric Acid	=	49

Hence it appears that liquid Sulphuric Acid contains little more than 18 parts of water in 100 parts of liquid acid; but Oil of Vitriol or Sulphuric Acid of Commerce is seldom free from a larger quantity of water. For this reason we are directed to separate and reject the first twelfth part of the distilled acid product.

In performing this process, the retort employed should be thin, and of flint glass well annealed. Green glass, from its disposition to crack on any great and sudden change of its temperature, cannot be used. The receiver should also be of flint glass, and thin.

The heat of a large flame of spirit of wine may be used, or more economically, a chaffing dish containing burning charcoal, the heat being gradually increased until the acid is made to boil. No luting should be applied to the juncture of the retort and receiver, as the acid vapours having little capacity for heat are easily condensed, and the condensation for the most part takes place in the neck of the retort. These vapours might also act upon the luting, and contaminate the product.

Sulphuric Acid united to one atom of water cannot be made anhydrous by distillation, but if the acid contains more than one atom of water, the excess will rise with the first portions of acid, and the subsequent acid product will contain only one atom of water. For this reason the first portion of the acid product is rejected. Rejection of the first portion of acid serves also to free the product from Sulphurous Acid, which is sometimes present in the acid of commerce in consequence of the accidental admixture of vegetable matters. By observing the retort during the distillation, it may be known when the strong product is passing over, as dense greyish white fumes then become visible in its neck, in which they are condensed.

The density of the strongest acid was formerly supposed to be 1850 compared with water taken as 1000;

but many years ago Dr. R. Perceval, of Dublin, late Professor of Chemistry in the University, ascertained that pure Sulphuric Acid, made as dense as possible by boiling, had a specific gravity below 1850, and his observation has subsequently been confirmed. The specific gravity of Sulphuric Acid freed from water as much as can be done, is by Dr. Thomson made 1847 compared with water as 1000. In an experiment made by the writer, distilled Sulphuric Acid boiled for about ten minutes, and then let to cool in a closely covered platina crucible, had the specific gravity of 1845.62.

The following table gives the quantities of dry acid, and of the strongest pure Sulphuric Acid in the diluted acid, at different specific gravities. The table is calculated by the writer from one given by Dr. Ure in his Dictionary, p. 93, and will be found conveniently adapted to the use of the manufacturer or operative chemist, employing an hydrometer of the usual construction, or glass beads adjusted, according to a series of specific gravity in which the difference between any two consecutive numbers, except the two first, is ten.

100 PARTS OF LIQUID ACID.

Of Specific Gravity.	Contain of dry Acid.	Contain of liquid Acid spec. grav. 1845.5
1845.5	81.54	100
1840	78.04	95.7
1830	76.01	93.2
1820	74.52	91.3
1810	73.22	89.7
1800	72.14	88.4
1790	71.21	87.3
1780	70.35	86.2
1770	69.47	85.1
1760	68.73	84.2
1750	67.85	83.2

Of Specific Gravity.	Contain of Dry Acid.	Contain of liquid Acid spec. grav. 1145.5
1740	67.26	82.4
1730	66.44	81.4
1720	65.76	80.6
1710	65.15	79.8
1700	64.72	79.3
1690	64.20	78.7
1680	63.13	77.4
1670	62.31	76.4
1660	61.75	75.7
1650	61.00	74.8
1640	60.28	73.9
1630	59.38	72.8
1620	58.69	71.9
1610	57.97	71.0
1600	57.54	70.5
1590	56.50	69.2
1580	55.75	68.3
1570	55.02	67.4
1560	54.37	66.6
1550	53.80	65.9
1540	53.08	65.0
1530	52.33	64.1
1520	51.60	63.2
1510	50.82	62.3
1500	50.55	61.9
1490	49.14	60.2
1480	48.44	59.4
1470	47.62	58.4
1460	46.81	57.4
1450	45.99	56.4
1440	45.18	55.4
1430	44.33	54.3
1420	43.48	53.3
1410	42.63	52.2
1400	41.98	51.4
1390	40.91	50.1
1380	40.06	49.1
1370	39.25	48.1
1360	38.21	46.8
1350	37.24	45.6
1340	36.35	44.5
1330	35.47	43.5
1320	34.57	42.3

Of Specific Gravity.	Contain of Dry Acid.	Contain of liquid Acid spec. grav. 1845.5
1310	33.64	41.2
1300	32.63	40.0
1290	31.68	38.8
1280	30.74	37.6
1270	29.79	36.5
1260	28.82	35.3
1250	27.82	34.1
1240	26.82	32.8
1230	25.72	31.5
1220	24.66	30.2
1210	23.57	28.9
1200	22.49	27.5
1190	21.45	26.3
1180	20.46	25.9
1170	19.51	23.9
1160	18.48	22.6
1150	17.36	21.2
1140	16.21	19.8
1130	15.21	18.6
1120	14.42	17.6
1110	13.16	16.1
1100	11.71	14.3
1090	10.76	13.1
1080	9.67	11.8
1070	8.40	10.3
1060	7.18	8.8
1050	5.99	7.3
1040	4.83	5.9
1030	3.65	4.4
1020	2.37	2.9
1010	1.14	1.3

From the preceding table we learn the quantities of acid and water to be used in forming a mixture of a required strength or specific gravity ; the quantity of real or dry acid in 100 parts of acid of known specific gravity. Further, the quantity of salt that can be produced by a determinate quantity of Sulphuric Acid of known speci-

fic gravity, may also be ascertained by reference to the table, the atomic weights of this acid, and of the base of the salt respectively.

It is right to observe, that if the numbers 40 and 9 correctly represent the atomic weights of Sulphuric Acid and water respectively, and that the strongest liquid acid consist of an atom of acid united to an atom of water, the numbers given at the head of the above table for the quantity of dry acid in 100 parts of the strongest liquid acid, should be 81.63 instead of 81.54 as given at the head of the preceding column: the difference is, however, in practice, immaterial.

In the following table are given the specific gravities of mixtures of Sulphuric Acid and water, containing each a determinate number of atoms of water.

Number of atoms of Water united to one atom of Acid.	Approximate specific gravity of mixture.
1	1845.5
2	1762
3	1634
4	1533
5	1462
6	1408
7	1366
8	1322
9	1303
10	1279
11	1258
12	1241
13	1227
14	1215
15	1203
16	1192
17	1182
18	1173
19	1164
20	1156

In the preceding process we are directed to keep the acid in a well closed vessel; without this precaution the Sulphuric Acid will absorb water from the atmosphere, and become much reduced in strength: for, it appears from direct experiment, that strong Sulphuric Acid will absorb more than its weight of water in the course of five days, and above six times its weight in a twelvemonth. Acid of specific gravity 1780 congeals at a temperature several degrees above the freezing point of water; the mixture so disposed to congeal is probably that which is formed by one atom of acid and two atoms of water, and which has the specific gravity of 1762. Acid of specific gravity 1850 or pure acid of specific gravity 1845.6, requires the highest temperature to cause it to boil, a temperature amounting to 620° according to Mr. Dalton; and consists of one atom of acid united to one atom of water. Observation of the boiling point of the acid was in some manufactures of Oil of Vitriol used to ascertain, in the process of concentrating the acid, when it has attained its greatest strength, which according to Mr. Dalton's experiments, can be determined with more precision by observing the boiling point than by the specific gravity, as the addition or subtraction of a considerable portion of water, when the acid is strong, makes little difference in the specific gravity, but a very considerable difference in the boiling point.

PROPERTIES AND TESTS OF ITS PURITY.—It should be perfectly limpid and colourless. Should have the specific gravity assigned to it. Should be free from Nitric or Muriatic Acid; Nitric Acid being discovered by the addition of Muriatic Acid and Leaf Gold, which is dissolved if Nitric Acid is present: Muriatic Acid being discovered by sufficient dilution of the Sulphuric Acid with water, and addition of Nitrate of Silver, which, if Muriatic Acid is present, causes a turbidness. A few

drops of the Sulphuric Acid, evaporated from the surface of a glass plate or slip of platina, should leave no residue.

USES.—*Pharmaceutical.* Sulphuric Acid is used in the preparation of the Acetic, Muriatic, Nitric and Tartaric Acids; also in that of diluted Sulphuric Acid. It is likewise used in preparing Bisulphate of Potash; Phosphate of Soda; pure Sulphate of Magnesia; Hydrosulphuret of Ammonia; brown Antimoniated Sulphur; Sulphate of Iron; Persulphate of Mercury; Sulphate of Zinc, Sulphuric Ethereal liquor; Nitrous Ether; Ointment of Sulphuric Acid; Acid Infusion of the Rose; Aromatic Sulphuric Acid; Hydriodate of Potash, and Sulphate of Quinine. In all these cases, with the exception of diluted Sulphuric Acid, and the preparations in which this is used, the commercial Sulphuric Acid is directed, as this is sufficiently pure, not containing more than from three to four per cent. of impurity, of which the greater part is, in many of the above instances, by the mode of operating excluded from the product.

—*Medicinal.* It is given internally, chiefly in cases of hæmorrhage from the lungs, stomach, intestines or uterus. It is also sometimes had recourse to in epistaxis, and it restrains colliquative sweats. In the form of Acid Infusion of the Rose it is frequently used as a gargle. It is not unfrequently given in combination with vegetable bitters, such as infusion of Cinchona or Colomba. In all the preceding cases, the diluted Sulphuric Acid is employed. When applied externally, as in the form of Ointment of Sulphuric Acid, the strong acid is used.

DOSE.—From one drop *by measure*, to four or five properly diluted with water.

USES.—*General.* For obtaining other acids on the large scale. For preparing Chlorine and bleaching salt;

Sulphate of Iron or Green Vitriol ; Sulphate of Zinc and Sulphate of Magnesia. It is also employed in bleaching and dyeing, and it is the most useful of all the acids. To the above purposes the commercial Sulphuric Acid is applied. In its pure state it is often employed by the scientific chemist.

DILUTED SULPHURIC ACID.

Take of pure Sulphuric Acid one part,
Distilled water seven parts.

Gradually add the acid to the water.

The specific gravity of this acid is to the specific gravity of distilled water, as 1084 to 1000.

When commercial Sulphuric Acid is added to water, the mixture is soon observed to become faintly turbid, and in the course of a few days, a deposit of a gray white powder is observed at the bottom of the vessel. This is Sulphate of Lead, which the strong Sulphuric Acid of commerce held in solution. In this case, the water uniting to the acid throws down the Sulphate of Lead, as this salt does not dissolve in diluted Sulphuric Acid. Sulphate of Potash, the other impurity generally contained in commercial Sulphuric Acid, remains in solution. Hence it is evident, that dilution of Sulphuric Acid with water will not completely free it from foreign substances, and that the only mode of obtaining diluted Sulphuric Acid perfectly pure, is by admixture of *distilled* Sulphuric Acid with water.

The specific gravity of this mixture was carefully de-

terminated, by adding one part of distilled Sulphuric Acid to seven parts of water; letting the mixture stand for a sufficient length of time; and weighing it in the usual manner. The specific gravity will be found to correspond very nearly with that given in the preceding table.

The acid forms one-eighth part of this mixture, each troy ounce containing a drachm of strong acid. The preparation is, in the proportion of acid to water, the same as that directed in the Dublin Pharmacopœia of 1807, or in the Edinburgh Pharmacopœia. In the London Pharmacopœia the proportion of acid to water is greatly increased, a fluid ounce and half of the densest Sulphuric Acid equal to 1261 grains, being mixed with fourteen fluid ounces and half or 6606 grains nearly of water; the Sulphuric Acid constituting a little less than one-sixth part of the mixture. It is evident, that a difference so great in the quantity of strong acid contained in these diluted acids of the different Colleges might cause inconvenience or injury, if for the form of the Dublin or Edinburgh were substituted that of the London Pharmacopœia.

In mixing the acid and water, heat is evolved; the acid should therefore be added to the water; but the heat produced, as might be expected, is less than in other mixtures of acid and water, in which a larger quantity of acid is employed.

TESTS OF ITS PURITY.—The same as for the pure Sulphuric Acid above mentioned.

USES.—*Pharmaceutical.* It is used in the preparation of Acid Infusion of the Rose and of Sulphate of Quinine.

—*Medicinal.* Already specified under the head of pure Sulphuric Acid. It can be very conveniently administered, and even in large doses, by combining it with thick mucilage.

It may also be elegantly given in combination with Conserve of the Rose.

USES.—*General*. In this form it is not applied to any general use.

TARTARIC ACID.

Take of Bitartrate of Potash, reduced to powder, ten parts,

Prepared Chalk, four parts,

Sulphuric Acid, seven parts,

Water, one hundred and twenty parts.

Mix the Bitartrate of Potash with one hundred parts of hot water, and gradually add the prepared Chalk, then as soon as the effervescence shall have ceased, pour off the clear supernatant liquor. Wash the residual Tartrate of Lime, until it shall have become tasteless. Into the clear decanted liquor drop as much of the water of Muriate of Lime as may be sufficient to throw down the Tartrate of Lime. Let this also be washed with water and mixed with the former deposit. Then add the Sulphuric Acid diluted with twenty parts of water, and employing frequent agitation, digest the mixture with a *medium* heat during three days. Pour off the supernatant acid fluid, and wash out the acid from the sediment. Let these liquors, including the first acid liquor and the washings, evaporate with a gentle heat to the point of crystallization. Let the crystals, purified by repeated solutions and crystallizations, be kept in a stopped glass vessel.

REMARKS.—The Bitartrate of Potash ; the Crystals or Cream of Tartar of commerce; from which, by this process the Tartaric Acid is extracted, consists of one atom or proportional of the Alkali Potash united to two atoms or proportionals of the Acid of Tartar. United to one atom of acid, the alkali forms Tartrate of Potash, a neutral and very soluble salt; hence, formerly named Soluble Tartar: combined with two atoms of acid the alkali forms Bitartrate of Potash, the cream or Crystals of Tartar, a salt which reddens litmus and has other acid properties. It requires a large quantity of water for its solution. By addition of Carbonate of Lime, according to the process of Scheele, the superabundant acid consisting of the second atom or proportional of Tartaric Acid, which gives acidity to the Bitartrate, is neutralized by the Lime of the Carbonate. This is done by adding to the pulverized Bitartrate of Potash, partly dissolved and partly diffused through hot water, Chalk or Carbonate of Lime in fine powder, so long as effervescence continues to arise from this addition. In this way Tartrate of Lime is formed, which, being nearly insoluble, is found in the bottom of the vessel, whilst the Tartrate of Potash remains dissolved in the water.

By this part of the process one half of the Tartaric Acid is separated from the Bitartrate of Potash, and obtained in combination with Lime. The remaining half of this acid is here directed to be detached from the Potash by Muriate of Lime, which, by double decomposition, throws down Tartrate of Lime. The latter is added to the former deposit, and the whole decomposed by diluted Sulphuric Acid, which, uniting to the Lime forms Sulphate of Lime, and detaches the Tartaric Acid. The different solubility of these products enables the operator to separate the Tartaric Acid from the Sulphate of Lime; accordingly, by washing with wa-

ter, the acid is obtained in solution. The acid liquor, sufficiently concentrated by heat, and let to cool, affords the Tartaric Acid in crystals. The evaporation of this acid liquor must be continued until a pellicle appears on the surface, as the Tartaric Acid is very soluble in water.

From the view here given of this process, it is evident that it may be divided into two operations, in each of which one atom of Tartaric Acid is taken from Potash and united to Lime; the first atom being abstracted from the Bitartrate, and the second from the Tartrate of Potash; and the Tartrate of Lime, by decomposition with Sulphuric Acid, is made to yield the Acid of Tartar.

The results are expressed by the following schemes:

Materials of first Process.

1 Potash	= 48	1 Carbonic Acid	= 22
2 Tartaric Acid	= 132	1 Lime	= 28
	<hr/>		<hr/>
1 Bitartrate of Potash	= 180	1 Carbonate of Lime	= 50

Products of first Process.

1 Potash	= 48	1 Lime	= 28
1 Tartaric Acid	= 66	1 Tartaric Acid	= 66
	<hr/>		<hr/>
1 Tartrate of Potash	= 114	1 Tartrate of Lime	= 94
		1 Carbonic Acid Gas	= 22
			<hr/>
		Total	= 116

Materials of second Process.

1 Potash	= 48	1 Muriatic Acid	= 37
1 Tartaric Acid	= 66	1 Lime	= 28
<hr/>			
1 Tartrate of Potash	= 114	1 Muriate of Lime	= 65

Products of second Process.

1 Potash	= 48	1 Tartaric Acid	= 66
1 Muriatic Acid	= 37	1 Lime	= 28
<hr/>			
1 Muriate of Potash	= 85	1 Tartrate of Lime	= 94

Materials of third Process.

2 Lime	= 56	2 Sulphuric Acid	= 80
2 Tartaric Acid	= 132	2 Water	= 18
<hr/>			
2 Tartrate of Lime	= 188	2 Oil of Vitriol	= 98

Products of third Process.

2 Lime	= 56	2 Tartaric Acid	= 132
2 Sulphuric Acid	= 80	2 Water	= 18
<hr/>			
2 Sulphate of Lime	= 136	2 Crystallized Tartaric Acid	= 150

Thus it appears, from theoretical views of the composition of Bitartrate of Potash and the atomic weights of Potash, Tartaric Acid, and Lime respectively, that 180

parts of dry Bitartrate of Potash, should afford in each of the two first processes 94 parts of Tartrate of Lime, or in all 188 parts of this Tartrate, which decomposed by 98 parts of liquid Sulphuric Acid or Oil of Vitriol, should yield 150 parts of crystallized Tartaric Acid.

To determine the quantity of Carbonate of Lime equivalent to the base of 100 parts of Bitartrate of Potash, the following experiment was made. 100 parts of Bitartrate of Potash were exposed to a heat sufficient to decompose the Tartaric Acid, and leave the Potash combined with Carbonic Acid and with charcoal diffused through the salt. From this mixture the Carbonate of Potash was extracted by repeated washing, and to the collected lixivium, neutral Muriate of Lime was added in excess: the precipitated Carbonate of Lime was washed and dried. Thus the quantity of Carbonate of Lime corresponding to the Carbonate of Potash, was determined. This experiment was repeated. In a third experiment on a large scale, in which 18 oz. of Bitartrate were decomposed by heat, the quantity of Carbonate of Lime was inferred by ascertaining the quantity of dry Carbonate of Potash afforded by repeatedly washing with water the residue of the Bitartrate of Potash after the exposure of this salt to a strong heat, and evaporation of the lixivium to dryness. In this experiment every 100 parts of Bitartrate of Potash yielded 31.2 parts of Carbonate of Potash, equivalent to 22.28 parts of Carbonate of Lime.

The results of the three experiments are here stated :

Expts.	Bitartrate of Potash.	Carbonate of Lime.
1st	100	24.25
2d	100	22.24
3d	100	22.28
Mean	100	22.9

Conformably with these results, the atomic weight of Tartaric Acid should be 76 instead of 66; adopting the supposition also, that the Bitartrate of Potash contains two atoms of water. It was inferred from the preceding experiments, that the quantity of Carbonate of Lime requisite to neutralize the superabundant acid in the Bitartrate of Potash, would be the quantity above stated, or 23 parts nearly of Carbonate of Lime to each 100 parts of Bitartrate of Potash, but on trial this quantity did not prove sufficient, as appeared from the following experiment. 100 parts of finely levigated Bitartrate of Potash were passed into about thirty times their weight of water, and the mixture made to boil in a platina capsule: the quantity of Carbonate of Lime indicated by the above experiments, namely, 23 parts, was first added; this was found insufficient, nor was the superabundant acid made neutral until 40 parts of Carbonate of Lime were added. This experiment was frequently repeated, and constantly with the same result. For this reason the quantities of Bitartrate and of Chalk, as given in this Pharmacopœia, were adopted. Why the exact quantity of Carbonate of Lime indicated by the

former experiments should not neutralize the superabundant Tartaric Acid, may be explained by supposing that in the circumstances of the experiment, less water than is requisite for solution of the Bitartrate of Potash being present, many of the particles of the Carbonate of Lime become enveloped on all sides with Tartrate of Lime, which prevents further contact between these particles of Carbonate of Lime and the disengaged Tartaric Acid. The difficulty might be obviated by using as much water as would dissolve the Bitartrate of Potash, but in this case the mixture would be inconveniently bulky, the salt requiring a very large quantity of water for its solution.

The quantity of Sulphuric Acid here directed, is a little below that requisite for the complete neutralization of the base of the Calcareous Salts; this, however, is not objectionable, as the Sulphuric Acid, if in excess, would contaminate the product of Tartaric Acid, and during the evaporation might contribute to char and blacken it.

It must be obvious to the Chemist, that when it is an object to obtain Tartaric Acid alone, and not at the same time Tartrate of Potash or Soluble Tartar, that the quantity of this acid, afforded by the same quantity of Bitartrate of Potash, according to the process here given, must be double of that obtained as directed in other Pharmacopœias, by the process of Scheele, which consisted in extracting from the Bitartrate the superabundant acid or second atom of Tartaric Acid only.

The quantity of Tartrate of Lime afforded by adding Muriate of Lime to Tartrate of Potash, is on trial found to be less than theory would lead to expect, as Tartrate of Lime has some solubility in water, and is still more soluble in a solution of Muriate of Potash; as appeared from experiment.

PROPERTIES AND TESTS OF ITS PURITY.—It should be colourless, and dissolve readily in water. A certain

determinate quantity of the solution of this acid in water, neutralized with water of caustic potash, should remain dissolved, but on adding a quantity of the same acid solution equal to that first employed, should deposit a large quantity of solid Bitartrate of Potash, nearly the whole of the salt being thus detached from the water. The formation of the solid Bitartrate, as the writer has found, is accelerated by rubbing the inside of the glass containing the mixture with a glass rod; crystals of the Bitartrate soon appearing in streaks on the parts of the glass exposed to this pressure. This effect of triture on the sides of the vessel, in accelerating the formation of crystals from a saline solution, was first observed by Dr. Wollaston in the production of Ammoniacal Phosphate of Magnesia from a watery solution of a Magnesian Salt: it is equally striking in the present instance, and probably depends on a similar cause.

With Muriate or Nitrate of Baryta, or with Nitrate of Silver, the aqueous solution of Tartaric Acid should not become turbid. Exposed to a heat sufficient for its decomposition, the coaly residuum should not contain Carbonate of Potash.

USES.—*Pharmaceutical.* It is not applied to any Pharmaceutical use. In preparing what are termed effervescing sodaic powders, it is sometimes substituted for Citric Acid. To produce neutralization, 75 parts of Crystallized Tartaric Acid require of the salts here annexed the following quantities :

Of dry Carbonate of Potash	..	..	70 parts,
Crystallized do.	..	..	101
Carbonate of Soda, dry	..	..	54
Do. Crystallized	..	..	144
Carbonate of Ammonia	..	..	39
Bicarbonate of Ammonia	..	..	61
Hydrated Bicarbonate of Ammonia	..		79
Hydrated Sesquicarbonate of Ammonia			118

The Tartaric Acid enters the composition of Tartrate of Potash; Tartrate of Potash and Soda; Tartar Emetic and Tartar of Iron; the Bitartrate of Potash being used to form these compounds.

USES.—*Medicinal.* It is sometimes used instead of Citric Acid or Lemon Juice to form a refrigerant acidulous drink, or to prepare an effervescing draught when fresh Lemon Juice or Citric Acid cannot be obtained; according to the table above given, half a drachm of Crystallized Carbonate of Soda will be neutralized by 15.6 grs. of Crystallized Tartaric Acid, and very nearly by the same quantity of Citric as of Tartaric Acid. This effervescing compound, taken internally, is said to correct the tendency in the urine, to deposit Ammoniacal Phosphate of Magnesia.

DOSE.—The same as that of Citric Acid.

SECTION II.

ALKALIES.

WATER OF CAUSTIC AMMONIA.

Take of Muriate of Ammonia, reduced to powder,
three parts,

Fresh burned Quicklime, two parts,

Water, ten parts.

On the Quicklime passed into an earthen vessel, sprinkle one part of hot water, and cover the vessel. Let

the salt be dissolved in the remaining hot water. When the lime has fallen into a powder, and become cool, let it be passed into the retort and the saline liquor added to it. With a *medium* heat, let five parts distil into a refrigerated receiver.

The specific gravity of this liquor is to that of distilled water as 950 to 1000.

REMARKS.—In this process the Muriatic Acid is abstracted from the Ammonia by the Quicklime, which with the acid forms Muriate of Lime; this remains in the retort dissolved in water, and holds some of the superabundant Lime diffused through it: the Ammonia either passes over combined with water into the receiver, or in the form of gas comes into contact with water in the receivers, is absorbed, and constitutes the water of Ammonia. The atomic weights and transfer of the different substances here brought into action are thus represented:

Materials.

1 Ammonia	=	17	1 Quicklime	=	28
1 Muriatic Acid	=	37	14 Water	=	126
		—			—
1 Muriate of Ammonia	=	54	Total	=	154

Products.

1 Ammonia	=	17	1 Muriatic Acid	=	37
14 Water	=	126	1 Quicklime	=	28
		—			—
15 Liquid Ammonia			1 Muriate of Lime	=	65
of spec. grav. 950	=	143			

The above scheme represents the result on the supposition that the Muriate of Lime is left in a dry state in the retort, the quantity of water employed being such as to form with the disengaged Ammonia a

liquid of specific gravity 950. But a larger quantity of water is directed, and of this quantity a part only is to be distilled over. For, if we divide the alkaline product into different parts, we find the first portions to be the strongest, or to contain the most Ammonia; and as the distillation advances, the strength of the product diminishes, and at last water nearly pure passes over. It is therefore expedient to stop the distillation before the whole of the water has passed over, if we intend to obtain liquid Ammonia of considerable strength.

To prove this, an experiment was made with the following result:

Two parts of pulverized Muriate of Ammonia, one part of Quicklime slacked with some of the water, and twelve parts of water, were passed into a retort, heat gradually applied, and the mixture let to distil. The products, as they came over, were received separately, and their specific gravities taken.

Products.	Quantities.	Specific Gravities.
1st	3 oz. meas ^d .	945 temp. 60°
2d	1 oz. meas ^d .	975
3d	1 oz. meas ^d .	984
4th	1½ oz. meas ^d .	998

Several advantages are gained by the use of a smaller quantity of Lime than that formerly directed, and the process here given is much to be preferred to that of the Dublin Pharmacopœia of 1807, and is a considerable improvement on those given in the Pharmacopœias of London and Edinburgh. More Lime than is really

necessary was used, and the residue of the present process consisting principally of Muriate of Lime dissolved in water, and not of this salt, mixed with a large quantity of superabundant Lime, as in the processes hitherto followed, can easily be extracted from the retort, which need not be so large as that required in the process of 1807; and that violent agitation and spattering which take place when the mixture is rendered thick by an excess of lime, are moderated or avoided. As the Ammonia has a strong disposition to assume the gaseous form, the heat applied at the commencement of this process should be gentle, and increased very gradually. The comparative quantities of Muriate of Ammonia and Quicklime, according to these Pharmacopœias, are the following:

Pharmacopœias.	Muriate of Ammonia.	Quicklime.
London ..	54	40.5
Edinburgh ..	54	81
Dublin 1807. ..	54	81

But the real quantity of pure lime required by 54 parts of Muriate of Ammonia is only 28 parts, and in this Pharmacopœia 36 parts are directed, or 2-3ds of the weight of the Muriate of Ammonia. This excess above the true equivalent quantity is directed in order to compensate for the impurity of the quicklime as obtained from the kiln.

To bring the Lime and Muriate of Ammonia into complete contact, it is directed that the salt shall be first dissolved in part of the water. If the solution of the Muriate of Ammonia were poured whilst hot on the lime, a large quantity of the Ammonia would be immediately extricated with much inconvenience to the operator, and

some loss of product; it is therefore directed that the saline solution shall be suffered to cool. On its cooling, especially in cold weather, it deposits a small part of the Muriate of Ammonia in crystals; these should be poured with the liquor into the retort, as the heat applied during the process will dissolve them. At the commencement of the process, as soon as the heat begins to act on the materials, the Ammonia predominates in so great a degree as to pass off abundantly in the gaseous form; and would be lost if water were not present to absorb it; this water is supplied, in part by that which rises from the materials in the retort, and in part also by the water in the receivers. The water volatilized from the materials is not sufficient at the commencement of the process for the condensation of the Ammoniacal Gas; it is therefore advisable to introduce a little distilled water into the receiver, for the purpose of absorbing this portion of the product. The strength of the product will depend, on the quantity of the water employed in the process, and, as the proportion of water to Ammonia increases in the progress of the distillation, also on the extent to which this is carried. In the Pharmacopœia of 1807 the specific gravity of the product was stated at 936; it is, however, difficult to obtain it of this strength without peculiar precautions, and the ordinary specific gravity of the product, or 950, is that given in this Pharmacopœia. In an experiment made by the writer, with the materials mixed in the proportions above given, the product had the specific gravity of 954.

The quantities of Ammonia and water contained in the liquid Ammonia of different specific gravities, are expressed in the following table, constructed by Sir H. Davy:

Specific Gravity.	Ammonia in 100 parts of liquid.	Water in do.
0.8750	32.50	67.50
0.8875	29.25	70.75
0.9000	26.00	74.00
0.9054	25.37	74.63
0.9166	22.07	77.93
0.9255	19.54	80.46
0.9326	17.52	82.48
0.9385	15.88	84.12
0.9435	14.53	85.47
0.9476	13.46	86.54
0.9513	12.40	87.60
0.9545	11.56	88.44
0.9573	10.82	89.18
0.9597	10.17	89.83
0.9619	9.60	90.40
0.9692	9.50	90.50

If Ammonia be represented by the number 17, and water by 9, the following table, constructed from one given by Dr. Ure in his Chemical Dictionary, will shew the per centage and specific gravities of different mixtures of Ammonia and water, each containing a determinate number of atoms:

Atoms of Ammonia.	Atoms of Water.	Quantity of Ammonia per cent.	Specific Gravity of mixture, water being 1000.
1	6	23.9	9073
1	7	21.2	9177
1	8	19.1	9254
1	9	17.3	9317
1	10	15.9	9363
1	11	14.6	9420
1	12	13.6	9444
1	13	12.7	9482
1	14	11.8	9560

Dr. Ure calculates that in liquid Ammonia of specific gravity 900, one volume of distilled water is united to 505 volumes of Ammoniacal Gas. He also gives a useful formula for determining the quantity of pure Ammonia contained in 100 parts of the water of Ammonia of known specific gravity, namely, that if from 998 we deduct the specific gravity of the specimen, expressed in three integers, the remainder divided by four will give a quotient representing the quantity of real alkali present, and this rule is exact for all such liquid Ammonia as is commonly used in medicine, viz. between specific gravities 936 and 980, water being 1000. He also asserts that the above table by Sir H. Davy, assigns to the water of Ammonia at different specific gravities a quantity of Ammonia too great by about one per cent. The liquor remaining in the retort when the process is ended, yields by evaporation the dried Muriate of Lime of this Pharmacopœia. The Water of Ammonia should be kept in bottles carefully closed with a glass stopper, as Ammonia

acts on cork. It is best kept in small phials; for in large bottles, especially when only in part filled with the fluid, the stoppers are occasionally forced out by the expansion of the gaseous Ammonia in the upper part of the bottle, with loss of the Alkali or admission of atmospheric air.

PROPERTIES, AND TESTS OF ITS PURITY.—It should have the sensible qualities of Ammonia, and its pungent odour and peculiar taste in a very high degree. The colour of paper tinged by Turmeric, should immediately change to reddish brown when held during a few seconds over the Water of Ammonia. A few drops of it evaporated from a capsule of glass or platina should leave no residue. Neutralized by Nitric or Acetic Acid, it should afford no precipitate with the soluble salts of Baryta or with Nitrate of Silver. It should also have the specific gravity here assigned to it.

USES.—*Pharmaceutical.* It is used in the preparation of Hydrosulphuret of Ammonia; of Ammoniated Submuriate of Mercury; of Liniment of Ammonia, and of compound Liniment of Camphor.

—*Medicinal.* In its pure state it is highly stimulant, and applied externally by means of a sponge or piece of linen, it produces vesication. The pungency of its vapour is an objection to its general use for the latter purpose, and to moderate its action it is united to oil, as in the Liniment of Ammonia, or is diluted with spirit, as in the compound Liniment of Camphor. Applied to the nostrils it acts as a powerful stimulant, and is not unfrequently used in cases of Asphyxia or Syncope. It is sometimes given internally in doses of from ten to twenty drops, largely diluted with water, as a stimulant and diaphoretic.

USES.—*General.* In Chemical Analysis it is much employed, chiefly for the purpose of throwing down from

their solutions Alumine, Phosphate of Lime, and Metallic Oxides; and as a test of the presence of copper and some other metals.

WATER OF CAUSTIC POTASH.

Take of Carbonate of Potash from Potashes of Commerce,

Fresh burnt Lime, of each two parts,

Water, fifteen parts.

On the Lime in a vessel of earthen ware, let one part of hot water be sprinkled, and when the lime is slacked let the salt be immediately mixed with it; then let the remainder of the water be added. When the mixture has cooled, pass it into a well stopped bottle, and with frequent stirring let it be kept during three days. When the Carbonate of Lime shall have subsided, let the supernatant liquor be poured off, and included in bottles of green glass most carefully stopped.

The specific gravity of this fluid is to that of distilled water as 1080 to 1000.

REMARKS.—In this process Lime, having a stronger attraction than Potash for Carbonic Acid, abstracts this acid from the alkali, and forms with it Carbonate of Lime, a salt insoluble in water, which subsides; the Potash in its pure or caustic form remaining dissolved in the water.

The annexed scheme represents the changes in this case, supposing the materials of absolute purity.

Materials.

1 Carbonic Acid	=	22	1 Lime	=	28
1 Potash	=	48			
		—			
1 Carbonate of Potash	=	70			

Products.

1 Potash	=	48	1 Carbonic Acid	=	22
			1 Lime	=	28
					—
			1 Carbonate of Lime	=	50

In this statement the water is omitted, and the bare products of Potash and Carbonate of Lime are given, for the purpose of showing that transfer of the quantities of the principal ingredients which takes place in this process. That the water, according to its quantity, has a material influence on the result, was first rendered probable by some experiments made by Decroizilles, and detailed in the *Annales de Chimie*, vol. 60, p. 51. His results have been confirmed by experiments made with a view to the present Pharmacopœia. These experiments, which refer also to the quantity of Lime to be used in proportion to the Potash, may be thus stated:

Expt. 1. Lime and Carbonate of Potash were mixed in the proportion pointed out by theory, with a small quantity of water, amounting to eight times the weight of the Carbonate of Potash, and suffered to remain in contact, in a well closed bottle during some time. On examining the clear part of the liquor, it was found to effervesce strongly, and to make lime water turbid. The

quantity of lime was by different additions increased, until it amounted to one and a half times the weight of the Alkaline Salt; but Carbonic Acid still adhered to the Potash, as appeared from effervescence with an acid and precipitation of Carbonate of Lime from lime water. These experiments were repeated, with the quantities of the different ingredients as directed in the Pharmacopœia of 1807, but Carbonic Acid still adhered to the potash.

Expt. 2. Equal weights of Carbonate of Potash and of Lime were used, with a quantity of water, equal to sixteen times the weight of the Carbonate of Potash. The mixture was suffered to stand in a well closed bottle during 24 hours. The clear supernatant liquor had the specific gravity of 1048. It was quite free from Carbonic Acid, neither effervescing with an acid nor rendering lime water turbid. In the latter case, no alteration in the circumstances of the experiment was made except by increasing the quantity of water, and this rendered the lime capable of completely depriving the Carbonate of Potash of its Carbonic Acid.

Expt. 3. Took of Carbonate of Potash from Tartar 240 grains, Lime from Marble 97.5 grains; the equivalent quantity according to Dr. Wollaston's scale; Water 8 oz. mixed in a well stopped bottle, and suffered to stand, with occasional stirring, for twenty-four hours. The clear liquor, examined as before, contained Carbonate of Potash. Hence it appeared that the quantity of Lime which is considered as the equivalent quantity, will not in these circumstances completely abstract Carbonic Acid from Potash. The quantity of Lime was therefore gradually increased, the clear liquor examined after each addition, and it was ascertained that Carbonic Acid was not completely abstracted from the Potash until a quantity of Lime, amounting to 5-6ths of the weight of the Carbonate of Potash, was

employed. A quantity of water so large as that used in the last experiment, it was judged, would have too much diluted the preparation, and caused it to differ so materially from the preparation of the preceding Pharmacopœia of 1807, as to lead to error in apportioning its dose; accordingly, that quantity of water which is given in the formula at the head of this article, was directed; this, from the mode of operating, namely, by enclosing the whole mixture in a stopped bottle, frees the Alkaline Salt of the greater part of the Carbonic Acid which adheres to the alkali, and gives to the preparation the advantage of the liquor containing no lime, which might be dissolved but for the presence of some Carbonic Acid. The processes of the Edinburgh Pharmacopœia and of that of Dublin published in 1807, always afford a product, of which, the first portions obtained by filtration as directed, effervesce strongly with an acid, as these contain much Carbonic Acid in consequence of deficiency of water in the mixture. In the Dublin Pharmacopœia of 1807 the Carbonate of Potash has to the portion of water, which is first mixed with it and set to filter, the proportion nearly of 1 to $5\frac{2}{3}$; and experiment shows that when so small a quantity of water is used, the alkaline product always contains much Carbonic Acid. The process of the Edinburgh College is exposed to the same objection. In the process of the London College, this defect is remedied, a quantity of water equal to ten times the weight of the Carbonate of Potash being directed; but the quantity of lime, as proved by the experiments above given, is insufficient for the total abstraction of the Carbonic Acid. From the effect of dilution with water, in promoting the decomposition of the Carbonate of Potash by lime, it is probable that the lime acts only so far as it is dissolved by the water. The objections to the latter processes are removed in this Pharmacopœia, in which the water of Caustic Potash is

obtained, of sufficient strength, with materials less bulky than those formerly employed, and free from lime.

PROPERTIES AND TESTS OF ITS PURITY.—The water of Caustic Potash should have a high degree of causticity, and should strongly affect the colour of infusion of blue cabbage, or of paper tinged by turmeric, and it should restore the blue colour to litmus made red by an acid. When Muriatic or Nitric Acid is added to a small portion of it, the mixture should not effervesce. In ascertaining the presence of Carbonic Acid by this test, the addition of the acid should be continued until the acid predominates, as in a mixture of a solution of Caustic Potash with Carbonated Alkali, the Carbonic Acid will not be expelled from the alkali, until the disengaged alkali is neutralized; this is best insured by the predominancy of the Muriatic or Nitric Acid in the mixture. The presence of Carbonic Acid is also determined by the addition of lime water. Should the specimen neither effervesce with an acid nor render lime water turbid, it should be examined by adding solution of Carbonate of Potash, which, if lime be present, will make the liquor turbid by the formation of Carbonate of Lime. This will also serve to separate superabundant lime; a minute quantity of Alkaline Carbonate dissolved in the liquor answering for the purpose, and adding an insignificant quantity of impurity to the alkaline fluid.

Water of Caustic Potash, when united to oil, forms a soap which dissolves both in water and in alcohol: it should have the specific gravity of 1080; this is an indication of its strength, if at the same time it is free from saline matter. As obtained from purified potashes or pearlashes, it frequently contains a small quantity of Sulphate of Potash, and sometimes of Muriate of Potash; a little silica and alumine are also in general present; but the quantity of the two last impurities is inconsiderable, and cannot have any material influence on its applica-

tion to medical use. The addition of Nitrate of Baryta and of Nitrate of Silver, to the alkaline liquor neutralized by Nitric Acid, will serve to detect the two first of these impurities. It can be made perfectly pure by the process of Berthollet only, as detailed in various systems of chemistry. When a solution of Tartaric Acid is added to it in such quantity that the acid shall predominate considerably in the mixture, an abundant precipitate of Bitartrate of Potash should appear.

USES.—*Pharmaceutical.* It serves to prepare Caustic Potash, and Caustic Potash with Lime. It is used also in the preparation of the water of Sulphuret of Potash; of the brown Antimoniated Sulphur, and of black Oxide of Quiksilver.

—*Medicinal.* It is sometimes, though not frequently, applied to internal use as a corrector of acidity; and is sometimes given in that species of calculus of the bladder, which is caused by Lithic Acid, although other alkaline remedies are generally preferred. It was recommended by Dr. Willan, in the treatment of lepra. Dr. A. T. Thomson asserts, that he has witnessed considerable benefit from its internal use in the treatment of psoriasis, connected with acidity in the primæ viæ. Many years ago Fourcroy proposed that in cases of urinary calculus arising from Lithic Acid, it should be so far diluted with water that it could be taken into the mouth without inconvenience, and in this state of dilution injected into the bladder previously evacuated; retained in that viscus during half an hour, or more, and then expelled. This proposal has not, however, been adopted. Much diluted with water it is sometimes applied externally in rickets. It has been recommended for the cure of scrofula, in doses of from one to three or four drachms by measure.

DOSES.—From ten drops to a drachm by measure, in some proper vehicle.

USES.—*General.* It is used chiefly in the manufacture of soap; and with fatty matters it forms a soft soap.

CAUSTIC POTASH.

Take of the water of Caustic Potash any required quantity. In a perfectly clean vessel of silver or iron, let the water evaporate by heat until the ebullition has ceased, and the saline matter, on increase of the heat, shall remain perfectly at rest in the vessel. Let the liquified Potash be poured out on a plate of silver or iron, and whilst concreting let it be cut into portions of a proper size; these should be immediately passed into a well stopped bottle.

The operator should carefully avoid the drops which are ejected from the vessel during the evaporation.

REMARKS.—By this process we obtain Caustic Potash in the solid form. We are directed to use a vessel of silver or of iron, because the hot Caustic Potash would act powerfully on glass, earthen ware, or some of the metals. Heat expels the water, and so long as this continues to pass off in form of steam, the ebullition continues; quiet fusion at length takes place, and the intimate chemical compound of potash and water denominated Hydrate of Potash is then formed.

From this compound the water cannot be detached by heat alone.

It consists of	1 Potash	= 48
	1 Water	= 9
		—
	1 Hydrate of Potash	= 57

We are directed to pour this fused hydrate on a plate of silver or iron; on neither of which metals does potash exert any action; and whilst it is concreting, to cut it into pieces of a convenient size; this is done by rapidly drawing a knife in various directions across the mass. On cooling it can easily be broken into pieces, which should be passed into a bottle; this should be of green glass, and provided with a glass stopper, accurately fitted to it. We are directed to avoid the particles of hot Caustic Alkali ejected from the vessel during the evaporation; as these are highly caustic, their activity is increased by heat, and exposure to them would endanger the eyes of the operator.

TESTS OF ITS PURITY.—By the processes here given it is never obtained pure, although of sufficient purity for medical purposes. It should be very deliquescent and soluble in water, and its solution should have the properties above assigned to the water of Caustic Potash. Its principal impurities may be detached by digestion with alcohol, which dissolves the potash only. By exposure of the alcoholic solution to heat, the alcohol is expelled and the potash obtained pure.

USES.—*Pharmaceutical.* Not applied to any Pharmaceutical use.

—*Medicinal.* Only used externally as a caustic, and chiefly in case of the bite of a rabid animal. Its disposition to deliquescence makes it an inconvenient caustic, as it is apt to spread beyond the part to which it is applied; this inconvenience may be remedied by covering the part with a piece of adhesive plaster, having in its centre an aperture exposing the surface of the skin on which the caustic is to act. It is thus used as an escharotic for forming issues in various deep seated diseases, particularly of the joints. It has also been applied topically for the removal of stricture of the urethra.

USES.—*General.* In its pure state it is frequently employed by the chemical analyst to dissolve various siliceous and aluminous compounds, and fit them for decomposition.

CAUSTIC POTASH WITH LIME.

Let the water of Caustic Potash evaporate to the fourth part, then add of recently burned lime, reduced to powder, as much as may be sufficient to form a mass of a proper degree of consistency; to be preserved in a well stopped vessel.

REMARKS.—In this preparation the water is expelled by heat from the water of Caustic Potash, which is brought to such a degree of concentration, that when lime is added the mixture on cooling becomes solid. A granular mass is then formed, consisting of the Hydrates of Potash and of Lime, cohering but not chemically united.

TESTS OF ITS PURITY.—Water should dissolve a part and exhibit the properties already detailed, as belonging to water of potash. Muriatic Acid should dissolve the remainder, from which the lime may be separated by addition of an Alkaline Carbonate, Sulphuric Acid, or Oxalate of Ammonia.

USES.—It is employed as a caustic only. The causticity of the potash and its tendency to deliquesce, are diminished by union with the lime. For this reason it is neither so powerfully escharotic, nor so apt to extend beyond the part to which it is applied, as Caustic Potash.

SECTION III.

EARTHS.

LIME WATER.

Take of fresh burned Lime,
Hot water, of each one part.

Pass the lime into an earthen-ware vessel, and sprinkle over it the water, the vessel being covered whilst the lime grows hot and falls to powder; let then thirty parts of cold water be poured on the mixture. Let the vessel be again covered, and the mixture frequently stirred during twenty-four hours, and when the lime has subsided, let the clear liquor be decanted off and preserved in well stopped vessels.

REMARKS.—Lime, one of the alkaline earths, is composed of a metallic basis named Calcium, united to Oxygen. The number expressing the atomic weight of lime is 28, and on the supposition that it consists of one atom of each of its constituents, its composition is

1 Calcium	=	20
1 Oxygen	=	8
		—
1 Lime	=	28

Lime is of a grayish white colour, becoming perfectly white by union with water. On application of water to lime it grows hot, sends off a part of the water in form of

steam, and falls into a fine white powder: a process in common language termed slaking: it cannot be repeated by the affusion of more water, for the lime chemically combines with a definite portion of the water, which it converts into a solid, forming with it Hydrate of Lime. This attraction of the lime and water unites one proportional or atom of each of the constituents: and the solubility of this Hydrate of Lime in water enables us to prepare Lime Water.

No advantage would be gained in this process from the use of hot water, because lime presents an exception to the general law, and is more soluble in cold than in hot water. As a waste of so cheap an article as lime is of little importance, and complete saturation of the water with the Lime is insured by using an excess of lime, in the process now adopted much more lime than the water can dissolve is directed; for, cold water does not dissolve more than 1-778th of its weight of the pure earth, according to Mr. Dalton's experiments. The mixture should be kept in a bottle, carefully stopped, to exclude atmospheric air, which, by imparting Carbonic Acid, would interfere with the union of the lime and water. Inconvenience arises from keeping the water on the lime, as directed in the process of the London Pharmacopœia, it being difficult to withdraw the supernatant lime water from the vessel without disturbing the lime at the bottom of the vessel, and destroying the transparency and purity of the lime water. For this reason it is more convenient to let the water and lime remain in contact for a few days, with occasional agitation, and after subsidence of the solid part of the mixture to decant or draw off the clear supernatant liquor, and preserve it in well stopped phials, which should be kept nearly filled with the fluid. If the latter precaution is not observed, that part of the internal surface of the vessel which is exposed to the atmospheric air, will become encrusted with a film of Carbonate of Lime.

PROPERTIES, AND TESTS OF ITS PURITY.—It should be colourless and very transparent, have a strong alkaline taste, and immediately change the colours of an infusion of blue cabbage and of paper tinged by turmeric. A stream of Carbonic Acid Gas passed through the water, either disengaged from a proper effervescing mixture or expired from the lungs, should produce immediate opacity, and at length separate the whole of the lime from the water in form of Carbonate of Lime; provided that an excess of Carbonic Acid is not used, which if sufficient would re-dissolve the precipitate. Lime Water made turbid by Carbonic Acid Gas, filtered, heated to ebullition continued during a few minutes, and again filtered, will, if pure, on evaporation leave no residue. On addition of diluted Sulphuric Acid no opacity should take place in Lime Water, but by *strong* Sulphuric Acid it is made turbid, from a cause probably similar to that which produces turbidness in strong Nitric or Muriatic Acids on addition of concentrated solutions of Nitrate or Muriate of Baryta, namely the abstraction of water from the salt by the strong acid. By the above experiments, the water is proved to contain an alkaline earth different from Baryta or Strontia, and no other foreign matter.

USES.—*Pharmaceutical.* It is used in the preparation of compound Lime Water; compound infusion of Sarsaparilla, and in that of the Liniment of Lime.

—*Medicinal.* It acts as a corrector of acidity. In some species of Dyspepsia it has been found useful. As it restrains mucous discharges it is not unfrequently employed in diarrhœa and leucorrhœa. It is sometimes used externally in Tinea Capitis. The taste of Lime Water is concealed by warm milk, but it is probable that the properties of the lime are altered by this addition.

DOSE.—From two to four ounces.

MAGNESIA.

Take of Carbonate of Magnesia any required quantity, pass it into a crucible, and expose it to a strong heat during two hours. When the Magnesia has cooled, preserve it in a glass vessel.

REMARKS. The feeble attraction exerted between Magnesia and Carbonic Acid is overcome by heat, which separates the Carbonic Acid in the elastic form, leaving the pure Magnesia.

Several experiments were made for the purpose of determining the degree of heat required to decompose Carbonate of Magnesia. It was found that a heat approaching to whiteness was by no means necessary, but that Carbonate of Magnesia parted with its Carbonic Acid at a low red heat, if continued for a sufficient length of time. A stronger heat probably adds to the difficult solubility of the Magnesia in acids. If the quantity operated on is large, a considerable time must elapse before the heat can penetrate to the centre of the mass. The product of this operation was formerly named Calined Magnesia.

Magnesia is now known to be the oxide of a metal, and its combining number to be 20: if then it consists of one atom of each of its constituents, the atomic weight of its base should be 12. The decomposition of Carbonate of Magnesia by heat and the results, are represented in the following scheme:

Materials.

1 Magnesia	=	20
1 Carbonic Acid	=	22
		—
1 Carbonate of Magnesia	=	42

Products.

1 Magnesia residual	=	20
1 Carbonic Acid Gas	=	22
		—
Total	=	42

PROPERTIES, AND TESTS OF ITS PURITY.—It should dissolve completely in diluted Sulphuric Acid, and show no effervescence whilst dissolving. It is not dissolved so rapidly as the Carbonate of Magnesia by an acid, and it requires the assistance of heat. The neutralized solution should afford no precipitate with the Oxalate of Ammonia. The application of these tests proves it to contain neither Carbonic Acid, Lime, Baryta, nor Strontia.

USES. It is not applied to any pharmaceutical use. It is given internally as an antacid and laxative, and is efficacious in dyspepsia when an acid is produced in the primæ viæ. It is more active than the Carbonate of Magnesia, as it contains under the same weight more Magnesia, but it is less agreeable to the taste; and from its diminished solubility, arising from exposure to a strong heat, it is less efficacious than its carbonate as a corrector of acidity in the stomach or intestines.

DOSE.—From ten grains to twenty.

From inspection of the preceding scheme it is evident that twenty grains of it are equivalent to 42 grains of Carbonate of Magnesia.

SECTION IV.

ALKALINE SALTS.

WATER OF ACETATE OF AMMONIA.

Take of Carbonate of Ammonia, one part.

Add gradually, and with frequent agitation, as much distilled Vinegar as may be requisite to saturate the Ammonia, namely, about thirty parts. The saturation may be determined by means of Litmus.

REMARKS.—This preparation is most conveniently made by adding the pulverized Carbonate of Ammonia to the distilled Vinegar. The quantity of Carbonate of Ammonia required for a certain quantity of distilled Vinegar will depend on the quantity of Ammonia present in the alkaline salt, and of acid in the distilled Vinegar. Of these quantities both are variable. The following are the results of different experiments.

Experimenter.	Distilled Vinegar, a pint.	Carbonate of Ammonia used.
Dr. A. T. Thomson,	of spec. grav. 1007.	grs. 320
Mr. Brande,	spec. grav. 1009.	105
Translator,	spec. grav. 1005.	280

From the discordancy of these results it evidently follows, that to prepare this solution correctly, the alkali must be added to the acid until effervescence ceases, and the point of neutralization determined by means of test paper. In the experiment above quoted as made by the writer, the solution of the Acetate of Ammonia had the specific gravity of 1011 compared with water as 1000. As Distilled Vinegar contains Acetic Acid in small and variable quantity, the solution of Acetate of Ammonia must be weak; its strength varying in proportion to the quantity of Acid contained in the vinegar.

The annexed scheme represents the changes in this case, distilled Vinegar being supposed to consist of one atom of acid united to 106 atoms of water.

Materials.

1 Acetic Acid	=	50	1 Ammonia	=	17
106 Water	=	954	1 Carbonic Acid	=	22
<hr/>					
Diluted Acetic Acid	=	1004	1 Carbonate of Ammonia	=	39

Products.

1 Acetic Acid	=	50	1 Carbonic Acid Gas	=	22
1 Ammonia	=	17			
106 Water	=	954			
<hr/>					
Water of Acetate of Ammonia	=	1021			

Should the Ammonical Salt employed be the Hydrated Sesquicarbonate the arrangement should be as follows :

Materials.

2 Acetic Acid	=	100	2 Ammonia	=	34
212 Water	=	1908	3 Carbonic Acid	=	66
	—		2 Water	=	18
Diluted Acetic Acid	=	2008		—	
			1 Hydrated Sesqui-		
			carbonate of Am-		
			monia	=	118

Products.

2 Acetic Acid	=	100	3 Carbonic Acid Gas	=	66
2 Ammonia	=	34			
214 Water	=	1926			
	—				
Diluted Acetate of					
Ammonia	=	2060			

Acetate of Ammonia may be obtained in the crystallized form. I have been informed by Dr. Perceval, late Professor of Chemistry in the University, that he obtained Acetate of Ammonia in crystals by distilling a mixture of Muriate of Ammonia and Acetate of Lead. Dr. Thomson states that he has often crystallized it by confining the concentrated solution along with Sulphuric Acid under the exhausted receiver of an air pump. The form of its crystal, according to Dr. Thomson, is that of a four-sided oblique prism terminated by a rhomb. The crystals are extremely deliquescent. Its composition, according to the same authority, is that of

1 Dry Acetate	=	67
7 Water	=	63
	—	
1 Crystallized Acetate of Ammonia	=	130

PROPERTIES, AND TESTS OF ITS PURITY.—The water of Acetate of Ammonia should be transparent and colourless. It should also be neutral, or have only a slight excess of acid. A small portion of it exposed to heat on a capsule of glass or platina, should evaporate, leaving no residue. When made very dense by evaporation, it should yield the fumes of Acetic Acid on addition of strong Sulphuric Acid. Ammonia should be disengaged from it by Potash or Lime. Added to a solution of Protonitrate of Mercury it should cause an immediate deposition of Acetate of Mercury.

USES.—*Medicinal.* When its operation is aided by external warmth and tepid diluents, it acts as a gentle diaphoretic, and it is long known as a useful remedy for the purpose of causing perspiration, under the name of Spirit of Mindererus. As it does not excite the system in any considerable degree, it may be used when heating sudorifics would be inadmissible. It will act as a diuretic if the surface of the body be kept cool. It is sometimes applied externally as a discutient, and is said to be a valuable external application in cases of mumps. In opacity of the cornea it was employed by Boerhaave. Dr. A. T. Thomson recommends it diluted with Rose Water, holding in solution a small quantity of opium as an excellent collyrium in chronic Ophthalmia; and still more largely diluted it is occasionally used as an injection in the commencement of Gonorrhœa. He also asserts, that he has used it with the best effect as a lotion in porrigo affecting the scalp.

DOSE.—It may be given in doses larger than are generally prescribed, the distilled Vinegar with which it is prepared being weak. Its dose may be stated to be, from six drachms to an ounce and half.

CARBONATE OF AMMONIA.

Take of Muriate of Ammonia pulverized and well
dried,
Dried Carbonate of Soda, of each one part.

Pass the mixture into an earthen-ware retort, and with a heat gradually increased, sublime the Carbonate of Ammonia into a refrigerated receiver.

REMARKS.—In this case a double elective attraction promoted by heat is exerted; Carbonate of Ammonia is formed, and rising in vapour from the mixture, passes into the receiver in which it is condensed; Muriate of Soda remaining in the retort.

The quantities of the ingredients in this process, in accordance with the atomic theory, and the resulting changes, may be thus represented.

Materials.

1 Muriatic Acid	= 37	1 Soda	= 32
1 Ammonia	= 17	1 Carbonic Acid	= 22
	—		—
1 Muriate of Ammonia	= 54	1 Carbonate of Soda	= 54

Products.

1 Muriatic Acid	= 37	1 Ammonia	= 17
1 Soda	= 32	1 Carbonic Acid	= 22
	—		—
1 Muriate of Soda	= 69	1 Carbonate of Ammonia	= 39

An explanation of this process more conformable to the views now adopted respecting the composition of Muriatic Acid and dried Sea Salt may be given, this appears in the annexed scheme :

Materials.

1 Muriatic Acid	{ 1 Chlorine = 36 1 Hydrogen = 1	1 Soda	{ 1 Sodium = 24 1 Oxygen = 8
1 Ammonia	= 17	1 Carbonic Acid	= 22
	—		—
1 Muriate of Ammonia	= 54	1 Carbonate of Soda	= 54

Products.

1 Chlorine	= 36	1 Ammonia	= 17
1 Sodium	= 24	1 Carbonic Acid	= 22
	—	1 Water	{ 1 Oxygen = 8 1 Hydrogen = 1
1 Chloride of Sodium	= 60		—
			48

It is asserted by Dr. Thomson and Mr. Philips that the Salt of Commerce is almost constantly a Sesquicarbonate of Ammonia : in this case a different view should be given of the relative quantities of the ingredients in this process :

Materials.

3 Muriatic Acid	{ 3 Chlorine = 108 3 Hydrogen = 3	3 Soda	{ 3 Sodium = 72 3 Oxygen = 24
3 Ammonia	= 51	3 Carbonic Acid	= 66
	—		—
3 Muriate of Ammonia	= 162	3 Carbonate of Soda	= 162

Products.

FIXED.		SUBLIMED.	
3 Chlorine	= 108	2 Ammonia	= 34
3 Sodium	= 72	3 Carbonic Acid	= 66
	—	2 Water	$\left\{ \begin{array}{l} 2 \text{ Oxygen} = 16 \\ 2 \text{ Hydro-} \\ \text{gen} = 2 \end{array} \right.$
3 Chloride of Sodium	= 180		
		1 Sesquicarbonate of Ammonia	= 118
		<i>add to this</i>	
		1 Ammonia volatilized	= 17
		1 Water do.	= 9
		Total	= 144

It appears from the above scheme, that an atom of Ammonia and an atom of water escape, leaving two atoms of Ammonia united to three atoms of Carbonic Acid and two atoms of water.

When this salt is exposed to air, it is changed into Bicarbonate of Ammonia; an atom of Carbonate of Ammonia passing off; as will become evident on inspection of the preceding scheme: consistently with this view, its composition may be supposed to be an atom of Bicarbonate united to an atom of Carbonate of Ammonia; for the composition of the Bicarbonate of Ammonia is

1 Ammonia	= 17
2 Carbonic Acid	= 44
2 Water	= 18
	—
1 Bicarbonate of Ammonia	= 79

To produce a complete reciprocal action of materials, they should be reduced to fine powder and well mixed. The vessel used in the process should be of earthen-ware, as best adapted to sustain the heat; the receiver straight; to allow of the easy extraction of the sublimed product; having a tube proceeding from it dipping into water, to intercept the Ammonia, which otherwise would escape, with inconvenience and loss.

A product of greater whiteness and purity is obtained by Carbonate of Soda, than by Chalk as directed in the processes of the London and Edinburgh Colleges; the principal objection to the use of Carbonate of Soda, is the increased expense of the process. Here it may be observed, that the quantity of Chalk directed in the forms of the London and Edinburgh Colleges is much too great; as 54 parts of Muriate of Ammonia require but 50 parts, or less than its weight of Chalk for decomposition; but a quantity of Chalk equal to one and half times the weight of the Muriate of Ammonia is directed by these Colleges.

PROPERTIES, AND TESTS OF ITS PURITY. It should be of a pure white colour; of a soft texture yielding to the pressure of the nail; and of an agreeable ammoniacal smell. When heated on a slip of glass or platina, it should evaporate without leaving any residue. Paper stained by Turmeric, held over this salt, has its colour changed to reddish brown. On free exposure to air for a sufficient time, it loses its smell; and paper tinged by Turmeric held over it, is not found to be discoloured. It is thus converted into Bicarbonate of Ammonia; an atom of Carbonate of Ammonia escaping from each atom of the compound. In this case its perfect conversion into Bicarbonate of Ammonia, according to the writer's experience, is best determined by its solution in water remaining transparent when mixed with a solution of a salt of Mag-

nesia. It should effervesce when added to any of the stronger acids; and mixed with a solution of Potash it should abundantly send forth Ammonia, especially on application of heat. Neutralized by Nitric or Muriatic Acid, it should not be rendered turbid by any of the soluble salts of Baryta.

Its solubility in water is variously stated by chemists, and will depend on the quantity of Bicarbonate of Ammonia which enters its composition, as the latter salt requires a considerable quantity of water to dissolve it. The Sesquicarbonate of Ammonia is generally stated to require four times its weight of water for solution, but it is frequently found to be more soluble. It is also asserted to be insoluble in Alcohol. That it dissolves in diluted spirit is proved by the mode of preparing the Aromatic Spirit of Ammonia. According to the writer's experience, rectified spirit, of specific gravity 836, at temperature 68°, on application of heat dissolved it with effervescence and extrication of Carbonic Acid Gas. The presence of Carbonate of Ammonia in the liquor was proved by its effervescing with an acid, and rendering Lime Water turbid. Proof spirit, as the writer ascertained, dissolves Carbonate of Ammonia abundantly.

USES.—*Pharmaceutical*. In preparing water of Acetate of Ammonia; Water of Carbonate of Ammonia; Ammoniated Copper; Spirit of Ammonia.

—*Medicinal*. Internally given it acts as a stimulant, diaphoretic, and antispasmodic, and in large doses as an emetic. As a stimulant it is sometimes used in gout; as a diaphoretic, or to correct acidity of stomach, in gout and chronic rheumatism; as an antispasmodic in hysteria; and as an emetic in cases of paralysis. It is also by some physicians considered as an expectorant, and with this view, as also to promote diaphoresis, it is given in catarrh or bronchitis. It may be administered either in watery solution sweetened with syrup or

sugar, or in form of pill united to a vegetable extract. The first of these forms is to be preferred. Applied externally to the nostrils, it is a useful stimulant in asphyxia and hysteria. It forms the basis of the common smelling salts.

DOSE.—From five to twenty grains.

WATER OF CARBONATE OF AMMONIA.

Take of Carbonate of Ammonia, four parts,
Distilled Water, fifteen parts.

Dissolve the Carbonate of Ammonia in the water and filter through paper.

The specific gravity of the solution is to that of distilled water as 1090 to 1000.

REMARKS.—In the Pharmacopœia of 1807 a preparation similar to this, but obtained by a different process, was directed. In the preparation as prescribed in the present Pharmacopœia, the relative quantities of water and salt are so adjusted as to give a solution of nearly the same strength as that directed by the Dublin College in 1807. The water used in preparing this solution should be cold, as the salt is decomposed by hot water.

TESTS OF ITS PURITY.—Nearly the same as those of the concrete Carbonate of Ammonia.

USES.—*Pharmaceutical.* In preparing Bicarbonate of Ammonia.

—*Medicinal.* The same as those of the concrete salt.

DOSE.—From a scruple to two drachms by measure.

BICARBONATE OF AMMONIA.

Take of Water of Carbonate of Ammonia, any required quantity.

In a suitable apparatus, let the water be exposed, until the alkali is saturated, to the stream of Carbonic Acid Gas which escapes during the solution of white marble in diluted Muriatic Acid. Then let it rest, and let crystals form, which are to be dried without heat, and preserved in a close vessel.

REMARKS.—The Bicarbonate and Carbonate of Ammonia resemble the corresponding Salts of Potash and Soda in this respect, that an increase of Carbonic Acid diminishes the solubility in water; the Bicarbonate of Ammonia requiring much more water than the Carbonate for solution; from this cause, a stream of Carbonic Acid Gas passed through a solution of Carbonate of Ammonia sufficiently concentrated, occasions the formation of Bicarbonate of Ammonia, and from the inferior solubility of this salt, its deposition from the liquor. For, according to the experiments of Berthollet; as given in the *Journal de Physique* for February 1807, p. 173, the Bicarbonate of Ammonia requires eight times its weight of water to dissolve it, whilst the Carbonate or Sesquicarbonate, from which it is formed, is never stated to require more than four times its weight of water for solution. The crystals produced in this process are of considerable size; have much less of the pungent alkaline taste or smell than the Carbonate or Sesquicarbonate of Ammonia, and suffer little change from exposure to air. Their formation is much promoted by the aid of pressure; the operation

is therefore accelerated by forcing the Carbonic Acid Gas, into the liquors contained in a close vessel, by means of a condensing syringe. The resulting changes in this process may be thus represented:

Materials.

2 Ammonia	=	34	1 Carbonic Acid Gas	=	22
3 Carbonic Acid	=	66			
2 Water	=	18			
<hr/>					
1 Sesquicarbonate of Ammonia	=	118			

Products.

4 Carbonic Acid	=	88
2 Ammonia	=	34
2 Water	=	18
<hr/>		
1 Bicarbonate of Ammonia	=	140

From inspection of the preceding schemes, and from the relative specific gravities of Carbonic Acid and Ammoniacal Gases, we obtain the following view of the relations of these gases in the different compounds which they form, estimated in volumes of each gas.

Carbonate of Ammonia.

Atoms.	Weight of do.	Volumes.
1 Ammonia	= 17	= 2
1 Carbonic Acid	= 22	= 1

Sesquicarbonate of Ammonia.

Atoms.	Weights of do.	Volumes.
2 Ammonia	= 34	= 4
3 Carbonic Acid	= 66	= 3

Bicarbonate of Ammonia.

Atoms.	Weights of do.	Volumes.
1 Ammonia	= 17	= 2
2 Carbonic Acid	= 44	= 2

The determination of the combining volumes of Ammonia and Carbonic Acid Gases, we owe to M. G. Lussac.

PROPERTIES, AND TESTS OF ITS PURITY.—Its smell and taste should be faintly Ammoniacal. When heated pretty strongly on a plate of glass or platina, it should evaporate without leaving any residue. Mixed with the stronger acids, effervescence should take place, and a loss of weight, amounting to 44 parts in every 70 of Salt, or 62.8 per cent. Its aqueous solution should cause no opacity in the Salts of Magnesia dissolved in water.

USES—*Medicinal.* It is diaphoretic, antispasmodic, and antacid. The properties of the Ammonia being more completely concealed in this salt than in the sesquicarbonate, it may be given in larger doses; and from the mildness of its taste and from its permanency, the introduction here made of Bicarbonate of Ammonia into the Pharmacopœia, which adds to our means of prescribing Ammonia in a form convenient and palatable, may be considered as a valuable improvement.

DOSE.—From six to twenty-four grains. It should be dissolved in *cold* water.

ACETATE OF POTASH.

Take of Carbonate of Potash from Crystals of Tartar any required quantity. Pour on it by repeated additions, distilled Vinegar of a *medium* heat, and in quantity about five times the weight of the salt. When the effervescence shall have ceased, and the liquor have given off vapours during some time, let the addition of the distilled Vinegar be repeated at intervals, until effervescence shall have completely ceased. By continued evaporation, the salt will become dry, and by a moderate increase of the heat it is to be cautiously liquefied. When the salt has cooled, let it be dissolved in water: filter the liquor, and boil it down until when removed from the fire, on cooling, it forms a mass of crystals, which should be perfectly white. Let it be immediately passed into bottles which should be carefully stopped.

REMARKS.—In this process the Acetic Acid of the distilled Vinegar is neutralized by the Potash of the Alkaline Salt; the Carbonic Acid escaping with effervescence. The whole of the Vinegar requisite for saturation is not at first added, as the Carbonic Acid, diffused through the mixture, would interfere with the accurate determination of the point of saturation; heat is therefore applied for some time, until the Carbonic Acid is expelled; Vinegar is then added, and the addition should be continued until the acid is present in a small excess.

The quantities of the ingredients, and the results of mixture, may be thus represented :

Materials.

1 Acetic Acid	=	50	1 Potash	=	48
106 Water	=	954	1 Carbonic Acid	=	22
<hr/>					
Distilled Vinegar	=	1004	1 Carbonate of Potash	=	70

Products.

1 Potash	=	48	1 Carbonic Acid	
1 Acetic Acid	=	50	Gas	= 22
	=	—	106 Water evapo-	
1 Acetate of Potash	=	98	rated	= 954
<hr/>				
Total				= 976

Therefore, 70 parts of Carbonate of Potash require somewhat more than fourteen times their weight of distilled Vinegar of the strength above given for neutralization. But, distilled Vinegar seldom has the strength here assigned to it. In an experiment made by the writer, 20 parts of dry and pure Carbonate of Potash required 460 parts of distilled Vinegar of specific gravity 1006, for neutralization, or 23 times the weight of the Carbonate of Potash. The quantity of real Acetic Acid indicated by this experiment in distilled Vinegar, did not amount to more than 3.1 per cent., instead of nearly five per cent. as above represented.*

* This experiment does not exactly correspond with that given at page 25 ; the latter result, as obtained with larger quantities of the ingredients, I consider the more accurate.

When the solution is evaporated to dryness, and the residual salt liquified by heat, some of the acid is decomposed, and a carbonaceous matter appears, which may be separated by re-dissolving the salt in water, and filtering the solution. When again evaporated to dryness, it affords a white salt. Thus prepared it always contains Alkali in excess, a part of the acid being decomposed or expelled by the heat used to produce liquefaction.

PROPERTIES, AND TESTS OF ITS PURITY.—It should appear as a soft white salt, of a foliated texture, hence formerly named *Terra Foliateda Tartari*. It should be highly deliquescent, and very soluble in both water and alcohol. On addition of strong Sulphuric Acid, the fumes of Acetic Acid should be copiously emitted. A concentrated solution of the salt in water should afford an abundant precipitate with the Acid of Tartar. A sulphate is detected by addition of any of the soluble salts of Baryta, and a Muriate by Nitrate or Acetate of Silver.

USES.—*Pharmaceutical*. In the preparations of Tincture of Acetate of Iron; Acetate of Mercury; Tincture of Acetate of Zinc.

—*Medicinal*. As a diuretic it is frequently given in the treatment of Dropsy. It is also considered to have some efficacy in Jaundice, or in any case when it is desirable to increase the urinary evacuation without heating the system.

USES.—*General*. In its neutral state I have found it may be used to separate Peroxide of Iron from Oxide of Manganese, when both are dissolved by an acid.

DOSE.—From a scruple to a drachm; given in larger doses it acts as a purgative.

CARBONATE OF POTASH FROM CRYSTALS
OF TARTAR.

Take of Crystals of Tartar any required quantity ; heat them to redness in a silver crucible lightly covered, until they cease to emit vapours. Let the residue be reduced to a coarse powder, and roasted in the same crucible without a cover, with frequent stirring during two hours : then boil it with twice its weight of water during a quarter of an hour, and after the requisite subsidence pour off the clear liquor. Let this be done three times. Filter the mixed washings, and let them evaporate in a silver vessel. Let the residual salt, whilst becoming dry, be reduced by frequent stirring to a granular form : then let it be heated to an obscure red. Before it has perfectly cooled take it from the vessel, and preserve it in well stopped bottles.

REMARKS.—In this process, the Tartaric Acid of the Bitartrate of Potash is decomposed by heat, and resolved into its elementary constituents ; these either in part pass off in the forms of Carburetted Hydrogen, Carbonic Acid, and Pyrotartaric Acid, or remain as carbon and oxygen, forming Carbonic Acid, united to the Potash and Charcoal. By the solvent action of water, in which Carbonate of Potash is very soluble, this salt is separated from the insoluble charcoal. The process of lixiviating with boiling water, is to be three times repeated, to insure the complete separation of the salt from the charcoal. For evaporation of the lixivia a vessel of silver is to be used, because, on this metal neither the alkali nor the water have any action. The saline product is to be heated to an obscure red, for the purpose of completely expelling the water, and any adhering extractive

matter; but a higher temperature than that directed should be avoided, as it might occasion the vessel to fuse. If the salt were dried without stirring, it would concrete into a hard unmanageable mass; frequent stirring is at this time prescribed, to produce granulation; this may be done with a rod of either Iron or Silver.

From the quantity of Potash contained in the anhydrous Bitartrate of Potash, as indicated by theory, it might be inferred that every 180 parts of this salt should yield 70 parts of Carbonate of Potash, or nearly 38.8 per cent.; and if the Bitartrate, contain two atoms of water, and the number representing the salt be 198, the quantity of Carbonate of Potash afforded should be 35.3 per cent.; but it appears from several experiments made by the writer, that the quantity obtained does not exceed 31.2 per cent.

PROPERTIES, AND TESTS OF ITS PURITY.—It should be, of a pure white colour, completely soluble in water, and highly deliquescent. Its taste strongly alkaline; and it should change the colour of an infusion of blue cabbage to green, and that of paper tinged by turmeric to reddish brown. It should dissolve with effervescence in Nitric Acid sufficiently diluted with water, and a neutral compound thus formed should not become turbid with either the Muriate of Baryta or Nitrate of Silver, and should yield an abundant precipitate with the Acid of Tartar.

USES.—*Pharmaceutical.* In the preparation of the water of Carbonate of Potash, and of Arsenical Liquor.

—*Medicinal.* As a corrector of acidity, and sometimes in calculus of the bladder when produced by Lithic Acid; though rarely, as Carbonate of Soda is generally preferred when an alkali is deemed eligible.

USES.—*General.* In soap-making and bleaching; but Carbonate of Potash of so great purity, and so expensive as that obtained from Tartar, is never used by the manufacturer. It is sometimes employed in chemical analysis, especially of siliceous minerals.

Dose.—From ten grains to half a drachm, properly diluted with water.

CARBONATE OF POTASH FROM POTASHES.

Take of Potashes, reduced to a coarse powder,
Cold water, of each one part.

Mix, by rubbing them together, and macerate during a week, in any open vessel, occasionally shaking the mixture. Then filter the lixivium and let it evaporate to dryness in a perfectly clean silver or iron vessel. Toward the end of the evaporation, let the saline mass be continually stirred with an iron rod. Thus reduced to a coarse powder, let it be laid by in close vessels. If the Potashes be not sufficiently pure; before they are dissolved, let them be roasted in a crucible until they become white.

REMARKS.—The Potashes of Commerce, as obtained from the ashes of vegetables, consist of Carbonate of Potash and other saline and earthy matters; principally Sulphate and Muriate of Potash, and Silica. From these it is in a great measure purified by the process here directed; for, as Carbonate of Potash is much more soluble in water than any of the other salts contained in the Potashes, and the silica and other earths which may be present are insoluble; the water, added to the mixture, which is directed in quantity scarcely sufficient to dissolve any salt but the Carbonate of Potash, takes up this salt, and leaves the greater part of the saline and earthy impurities. Frequent agitation of the mixture

is directed to promote the solvent action of the water on the salt; and with the intention of saturating the water it is suffered to remain on the Potashes for a week. The clear supernatant liquor holding the Carbonate of Potash in solution, is then to be drawn off from the saline and earthy impurities, and the water expelled by heat from the Carbonate of Potash. A clean vessel of iron or silver is prescribed for the evaporation, because the alkali does not act on these metals. The stirring of the salt whilst concreting, prevents its forming into hard unmanageable lumps. If the Potashes should be coloured by impurities, these may be in a great measure removed by first roasting the salt in a crucible, with free exposure to the air, which restores whiteness by decomposing and expelling the extractive and carbonaceous matter, from which its colour was principally derived.

This process has been many times repeated by the writer, who has found it to afford a Carbonate of Potash sufficiently pure for most purposes.

PROPERTIES, AND TESTS OF ITS PURITY.—It should readily dissolve in its own weight of water, and exhibit the properties above enumerated as belonging to Carbonate of Potash from Tartar. It always contains some foreign salts, particularly Sulphate of Potash, but in quantity not sufficient to interfere with most of the purposes to which Carbonate of Potash is applied.

USES.—*Pharmaceutical.* In preparing water of Caustic Potash, and the preparations made from it, Caustic Potash and Caustic Potash with Lime; also Bicarbonate of Potash; Sulphate of Potash; Bisulphate of Potash; and Tartrate of Potash. It is further applied in the preparation of Carbonate of Magnesia and in that of Sulphuret of Potash; Compound Decoction of Aloes; and Compound Mixture of Iron.

—*Medicinal.* The same as those of Carbonate of Potash from Crystals of Tartar.

DOSE.—From ten grains to half a drachm dissolved in a proper vehicle, and diluted. The latter direction of diluting it sufficiently should be attended to, as it possesses sufficient causticity to act as a poison, and instances have frequently occurred of its concentrated solution being swallowed with fatal consequences: a case of this kind is related by Mr. Dewar in the Edinburgh Journal, vol. 30, page 309; stricture of the œsophagus, the general result of this accident, having been induced.

WATER OF CARBONATE OF POTASH.

Take of Carbonate of Potash from Crystals of Tartar,
 one part,
Distilled Water, two parts.

Dissolve and filter.

The specific gravity of this solution is to the specific gravity of distilled water as 1320 to 1000.

REMARKS.—In this preparation we have an aqueous solution of the purest Carbonate of Potash of a definite strength, each drachm by weight containing a scruple of Carbonate of Potash. It is well adapted for internal use, for being made with pure materials, and having a regulated density it is always of the same strength. Should the density of the solution fall short of or exceed that above prescribed, more of the salt, of a denser solution, or of water should be added, till the proper density is obtained; the object of stating the specific gravity being to insure a fixed strength.

The following table gives the result of experiments made by Dr. Abel, in the College Laboratory, with the

writer's occasional inspection, on the specific gravities of solutions of Carbonate of Potash holding known quantities of this salt in solution. This table may prove convenient to the practical chemist. Dried Carbonate of Potash, obtained from tartar, was employed.

TABLE.

Specific gravity of aqueous solution of Carbonate of Potash.	Quantity of Carbonate of Potash in 100 parts of do.
1530	50.00
1337	33.33
1242	25.00
1191	20.00
1157	16.66
1133	14.28
1115	12.50
1103	11.11
1093	10.00
1083	9.09
1077	8.33

TESTS OF ITS PURITY.—The same as those of the Carbonate of Potash from Tartar, as above given.

USES.—*Medicinal.* Given under the head of Carbonate of Potash from Tartar. It is a convenient form for the administration of Carbonate of Potash, being pure and containing a fixed quantity of alkaline salt.

DOSE.—From half a drachm to a drachm and half, sufficiently diluted with water.

BICARBONATE OF POTASH.

Take of Carbonate of Potash from Potashes, one part ;
Distilled water, two parts.

Dissolve.

Expose the solution in a suitable apparatus to the current of Carbonic Acid Gas, which escapes when white marble is dissolved in diluted Muriatic Acid, until the liquor becomes turbid, then filter it, and again expose it to the stream of Carbonic Acid Gas, until the alkali is saturated: finally, let it rest in a cool place to form crystals, which are to be dried without heat, and preserved in well closed vessels.

REMARKS.—Potash, though united to the quantity of Carbonic Acid, with which it forms the Carbonate of this alkali, still retains a considerable attraction for Carbonic Acid, and will, by simple contact with this gas, take up an additional portion. The intention of the process here given, is by adding Carbonic Acid to Carbonate of Potash, to convert it into Bicarbonate. The apparatus should be so contrived that a continued stream of Carbonic Acid Gas may flow through the liquor. The absorption of the gas is much accelerated by employing pressure, and a condensing syringe is used when the process is carried on for the manufacture of large quantities of this salt. The gas is most conveniently obtained by the action of Muriatic Acid, sufficiently diluted with water, on white marble, in fragments just small enough to enter the mouth of the vessel intended for the mixture. The tubes through which the gas is conveyed into the alkaline liquor should be sufficiently wide, as their extremi-

ties are liable to become stopped by crystallization of the salt, and even when large, these tubes require occasional examination during the process.

Carbonate of Potash resembles other alkaline carbonates in having its solubility diminished by union with Carbonic Acid, therefore the quantity of water which dissolved the carbonate is insufficient for solution of the bicarbonate, and deposits the latter salt in the course of the operation.

The Carbonate of Potash, directed in this process, always contains a small quantity of Silica, which being detached from it by the Carbonic Acid, renders the liquid turbid. For this reason we are directed to filter the liquor to separate the Silica, which, if suffered to remain would impair the purity and appearance of the crystals. Pelletier, to whom we owe this process, remarked that crystals form in the liquor, even whilst undergoing agitation from the stream of Carbonic Acid Gas passing through it; but the largest and most regular crystals will be obtained from the liquor when suffered to remain at rest. Much heat cannot be used to obtain more crystals by concentration of the liquor, as the Carbonic Acid would in part be expelled, and the salt reconverted into a Carbonate.

The quantities of the ingredients, and their transfer, are thus represented:

Materials.

1 Potash	=	48	1 Carbonic Acid	
1 Carbonic Acid	=	22	Gas	= 22
16 Water	=	144		
		<hr/>		
Total	=	214		

Products.

1 Potash	= 48	15 Water	= 135
2 Carbonic Acid	= 44		
1 Water	= 9		
<hr/>			
1 Crystallized Bi- carbonate of Potash	} = 101		

PROPERTIES, AND TESTS OF ITS PURITY.—Taste, weakly alkaline. Its solution scarcely affects the colour of an infusion of blue cabbage, or of paper stained by Turmeric. Soluble in somewhat less than four times its weight of water at 60°. Dissolving in the stronger acids with effervescence; 100 parts of the salt losing 43.5 of its weight by escape of Carbonic Acid Gas. Its solution in Nitric Acid, saturated with the acid, when mixed with solutions of Nitrate of Baryta or Nitrate of Silver, should remain transparent, but should afford a copious deposit with a strong solution of Tartaric Acid. The Bicarbonate of Potash does not precipitate Magnesia from its salts. With solution of corrosive sublimate it does not, like the Carbonate of Potash, afford a brick red, but a white-coloured deposit. It crystallizes in the form of square prisms, terminated by quadrangular pyramids.

USES.—*Medicinal.* The same as those of Carbonate of Potash. The alkaline properties of the Potash being in a great measure neutralized by the Carbonic Acid, its flavour is much less disagreeable than that of the Carbonate. It may be taken in larger doses, and 101 parts of it are equivalent to 70 parts of dry Carbonate.

DOSE.—From fourteen to forty-three grains.

PURIFIED NITRATE OF POTASH.

Take of Nitrate of Potash, one part.

Dissolve in two parts of hot water, filter the liquor and set it aside, that on cooling, crystals may be formed.

REMARKS.—The Nitre or Saltpetre of Commerce is often impure, from the presence of foreign salts, chiefly the Murates of Soda and Potash. The Oxides of Iron and of Manganese, with some Silica, are also often present. From the greater part of these impurities the nitre may be detached by nearly saturating with the impure salt, water at the boiling temperature, filtering the liquor and allowing the solution to cool; the Nitrate of Potash being much less soluble in hot than in cold water, the greater part of this salt separates from the concentrated liquor on its cooling, whilst the foreign salts, having little difference of solubility in hot and cold water, of which a quantity will be present more than sufficient for their solution, remain dissolved. Nitre requires somewhat less than four times its weight of cold water, and its own weight of water at the temperature of 212° , for solution; hence the greater part of this salt is deposited on cooling of the liquor, to the exclusion of the alkaline muriates which remain in solution. The liquor which surrounds the crystals should be poured off; the crystals washed with a small quantity of distilled water, placed to drain and become dry.

Nitrate of Potash is composed of

1 Nitric Acid	=	54
1 Potash	=	48
		—
1 Nitrate of Potash	=	102

PROPERTIES, AND TESTS OF PURITY.—Its colour is snow white. Its taste cool, peculiar, and pungent. It crystallizes in six-sided flattened prisms, with dihedral summits. When heated strongly, it first melts, and on becoming red hot effervesces and gives off a mixed gas, composed of Oxygen and Nitrogen Gases. The addition of any carbonaceous matter to it when in a state of fusion, and nearly red hot, produces strong deflagration. The salt also produces deflagration when thrown on coals or charcoal sufficiently hot to cause its fusion. This property at once distinguishes it from Sulphate of Soda, with which it is often confounded. Sulphuric Acid, poured on this salt reduced to powder, disengages the fumes of Nitric Acid. Its concentrated aqueous solution should produce no turbidness with the solutions of Nitrate, Muriate, or Acetate of Baryta, or of the Nitrate of Silver, and, when sufficiently concentrated, should afford an abundant precipitate with the acid of Tartar.

USES.—*Pharmaceutical.* For preparing Nitric Acid and Nitrous Ether.

—*Medicinal.* In small doses, refrigerant and diuretic. At first it diminishes, but after some time increases the frequency of the pulse. It is often given internally in febrile cases. It has long been used in *Cynanche tonsillaris*, either by taking a portion of the crystals into the mouth, and letting it dissolve and come into contact with the affected part, or by using as a gargle the solution of the salt either in water or rose water. It may also be taken in the Almond Mixture. Nitre has been detected in the urine when the salt has been for some time used internally. Swallowed in doses exceeding half an ounce it is poisonous, causing obstinate and bloody vomiting, tenderness of the stomach and abdomen, purging, convulsions, and death. It produces also various nervous symptoms when taken in an over dose. A case of this kind is related in the Edinburgh Medical

and Surgical Journal, vol. 14. p. 34. In this case two ounces were swallowed by a mistake for Epsom Salts; this dose did not cause death, although the symptoms were of a most alarming nature. In such cases, copious dilution with mucilaginous fluids should be had recourse to: the stomach pump might be employed if there was reason to suppose that much of the salt remained in the stomach. Opium and aromatics are also recommended as remedies. Mr. Butler, who relates this account, states it to be a common practice with farriers, to fill the wounds of horses and horned cattle with Saltpetre, a practice which often produces gangrene and death.

DOSE.—From ten grains to half a drachm.

USES.—*General.* In preparing Nitrous Acid of commerce, and in the manufacture of Sulphuric Acid.

SULPHATE OF POTASH.

Let the salt which remains after the distillation of Nitric Acid be dissolved in a sufficient quantity of hot water. Add of Carbonate of Potash from Potashes, as much as may be sufficient to saturate the superabundant acid. Let the filtered liquor evaporate, that crystals may form.

REMARKS.—In the preparation of Nitric Acid, two atoms or proportionals of Sulphuric Acid were directed for one of Potash. The residuum is therefore Bisulphate of Potash, and may be converted into a Sulphate by neutralizing the excess of Sulphuric Acid remaining after the operation, by Potash. For this purpose, the Carbonate of Potash, as obtained from Potashes, is sufficiently pure. A large quantity of water should be

used, as the Sulphate of Potash requires much water for solution; 100 parts of water dissolving about 10.5 of this salt, at the temperature of 55° , or one part of the salt requiring about 9.5 times its weight of water for solution. Care should also be taken that the whole of the Nitric Acid is expelled from the residue by a sufficient heat; at the termination of the process for obtaining Nitric Acid, which affords this salt as a residue; as otherwise this acid being neutralized at the same time with the Sulphuric Acid by the Potash, Nitre may be obtained in combination with the Sulphate of Potash. The transfer of the principles in this case, and their quantities, are thus represented:

Materials.

1 Potash	=	48	1 Carbonic Acid	=	22
2 Sulphuric Acid	=	80	1 Potash	=	48
2 Water	=	18			—
		—	1 Carbonate of Potash	=	70
1 Bisulphate of Potash	=	146			

Products.

2 Potash	=	96	1 Carbonic Acid Gas	=	22
2 Sulphuric Acid	=	80	2 Water	=	18
		—			—
2 Sulphate of Potash	=	176	Total	=	40

From this statement it appears that every 146 parts of Bisulphate of Potash require 70 parts of Carbonate of Potash for neutralization, and yield 176 parts of Sulphate of Potash. On evaporating the solution sufficiently, and letting it cool, crystals are obtained. Crystals, the most regular in their form, and of the greatest size, are

obtained by spontaneous evaporation. The primitive form of the crystals is a right rhombic prism ; and when the salt is crystallized by spontaneous evaporation, it frequently appears as a six-sided prism, having a six-sided pyramid at each extremity, or as a dodecaedron with triangular faces.

PROPERTIES, AND TESTS OF ITS PURITY.—It should appear as a hard salt, perfectly neutral ; soluble in about ten times its weight of water ; its solution affording an abundant precipitate with Nitrate, Muriate, or Acetate of Baryta, and with the Acid of Tartar added in large quantity ; but, when sufficiently diluted not becoming turbid with the Nitrate of Silver.

USES.—*Pharmaceutical.* In moderate doses it acts as a mild aperient, and in larger doses as a cathartic. Its action is more permanent than that of other saline purgatives. It is said to be useful in the visceral obstructions of children. It is frequently given combined with Rhubarb by trituration, increasing the action of the latter purgative by promoting its minute division, which effect it contributes to produce by its great hardness.

DOSE.—From a drachm to half an ounce.

BISULPHATE OF POTASH.

Take of Sulphuric Acid of Commerce, two parts,
Carbonate of Potash from Potashes, as much
as may be sufficient,
Water, six parts.

Let one portion of the Sulphuric Acid mixed with the water be saturated by the Carbonate of Potash, then let the other portion of the acid be added to the mixture. Let the liquor evaporate, until, on cooling, crystals are formed.

REMARKS.—The annexed scheme represents the quantities and changes in this case:

Materials.

2 Sulphuric Acid	= 80	1 Carbonic Acid	= 22
2 Water	= 18	1 Potash	= 48
	—		—
2 Liquid Sulphuric Acid	= 98	1 Carbonate of Potash.	= 70

Products.

2 Sulphuric Acid	= 80	1 Carbonic Acid	
1 Potash	= 48	Gas	= 22
2 Water	= 18		
	—		
1 Bisulphate of Potash	= 146		

From the above view of the composition of Bisulphate of Potash, it is evident that the mode here directed will produce this salt. It has been frequently thus prepared by the writer, who has always obtained it in the form of a congeries of minute prismatic crystals of an extremely acid taste. Dr. Thomson, who prepared it by dissolving Sulphate of Potash in diluted Sulphuric Acid, and evaporating the solution, states, that it crystallizes in thin rhomboids, and that the plane angles of the larger faces are $97^{\circ} 20'$ and $80^{\circ} 40'$, and the inclination of the faces to each other are $107^{\circ} 15'$ and $72^{\circ} 45'$.

PROPERTIES, AND TESTS OF ITS PURITY.—It should have a very acid taste, dissolve readily in water, and in this state, afford a copious precipitate with any of the soluble salts of Baryta, and when sufficiently diluted

with water, remain transparent on addition of Nitrate of Silver. Made neutral by soda, it should give a deposit of Bitartrate of Potash, on the addition of Tartaric Acid in excess.

USES.—*Medicinal.* In consequence of the predominance of Sulphuric Acid, it must possess the general medicinal properties assigned to this acid. Bisulphate of Potash has been given with advantage conjoined with rhubarb; concealing its taste, and not injuring its purgative qualities. It may be used to form a cheap effervescing purgative salt; by neutralizing its superabundant acid with Carbonate of Soda: for this purpose, 73 grains of Bisulphate of Potash and 72 grains of Crystallized Carbonate of Soda may be dissolved separately, each in two ounces of water, mixed, and immediately swallowed whilst in a state of effervescence; increasing the dose and quantity of water if required.

DOSE.—From ten grains to half a drachm sufficiently diluted with water. When neutralized as above by soda, larger doses may be taken.

TARTRATE OF POTASH.

Take of Carbonate of Potash from Potashes, five parts,
Bitartrate of Potash, fourteen parts,
Hot water, forty-five parts.

To the Carbonate of Potash dissolved in the water, gradually add the Bitartrate of Potash most minutely pulverized; let the liquor, previously filtered through paper, evaporate; and set it aside, that by cooling crystals may be formed.

REMARKS. Potash and Tartaric Acid united, atom and atom, form a neutral compound: Potash retains an

attraction for an additional atom of Tartaric Acid, and with this forms a compound, the Bitartrate of Potash, in which the acid predominates. By neutralizing this additional atom with Potash, the Tartrate of Potash is formed. This will appear distinctly from inspection of the annexed scheme :

Materials.

1 Potash	= 48	1 Carbonic Acid	= 22
2 Tartaric Acid	= 132	1 Potash	= 48
2 Water	= 18		—
	—	1 Carbonate of	
1 Bitartrate of		Potash	= 70
Potash	= 198		

Products.

2 Potash	= 96	1 Carbonic Acid Gas	= 22
2 Tartaric Acid	= 132		
2 Water	= 18		
	—		
2 Tartrate of Potash	= 246		

In an experiment made by the writer, 60 grs. of dried Carbonate of Potash obtained from Tartar, dissolved in about 13 times its weight of water, required 168 grains of finely pulverized Bitartrate of Potash to produce neutralization; a result differing by an inconsiderable quantity from the preceding scheme; for $70 : 198 :: 60 : 169.7$. On this experiment was founded the process as above directed, and the relative quantities of materials here prescribed more nearly coincide with those which are actually required than those directed in the processes of the London or Edinburgh Colleges. According to the process of the London College; 5 parts of Carbonate of Potash are added to 11.2 of Bitartrate: the Edinburgh

College directs these salts to be mixed in the proportion of 5 to 15. In the first case there is a waste of Carbonate of Potash, and in the second of Bitartrate of Potash, as the exact quantity of Bitartrate of Potash for 5 parts of Carbonate of Potash should be 14.14.

Tartrate of Potash is sometimes formed by abstracting from the Bitartrate of Potash its excess of acid by means of Carbonate of Lime; and thus obtaining an insoluble Tartrate of Lime, from which Tartaric Acid is afterwards procured as in the first process given at p. 79, whilst Tartrate of Potash remains dissolved in the water, from which it is separated by evaporation and crystallization.

PROPERTIES, AND TESTS OF ITS PURITY.—It is very soluble in water, dissolving in its own weight of water at the temperature of 60° . It crystallizes in the form of tetraedral prisms terminated by dihedral summits. The addition of the Acid of Tartar to its concentrated solution causes a precipitation of Bitartrate of Potash. It immediately decomposes the aqueous solutions of the Salts either of Lime or of Lead. When exposed to heat it yields its water of crystallization, and then becomes black. It should appear neutral when examined with test papers.

USES.—*Medicinal*. It is a mild purgative, is supposed to have some cooling operation, and is recommended in maniacal and melancholic cases. It promotes the operation of several vegetable purgatives, and corrects their griping properties.

DOSE.—From one drachm to an ounce.

ACETATE OF SODA.

Take of Carbonate of Soda any requisite quantity,
 Distilled Vinegar, as much as may be sufficient to saturate the Alkali.

Let the filtered liquor evaporate until it shall have attained the specific gravity of 1276.

By cooling, let crystals be formed, which are to be cautiously dried and kept in a close vessel.

REMARKS.—In this process the Acetic Acid, expelling the Carbonic Acid with effervescence from the Carbonate of Soda, unites to the Soda, which is obtained in the solid and crystallized form by evaporation and cooling of the liquor.

Materials.

1 Acetic Acid	=	50	1 Soda	=	32
106 Water	=	954	1 Carbonic Acid	=	22
		—	10 Water	=	90
Distilled Vinegar	=	1004.			—
			1 Crystallized Carbonate of Soda	=	144

Products.

1 Acetic Acid	=	50	1 Carbonic Acid		
1 Soda	=	32	Gas	=	22
6 Water	=	54	110 Water, disengaged	=	990
		—			—
1 Acetate of Soda	=	136			
			Total	=	1012

But, as according to the result of an experiment given at p. 121, distilled Vinegar has a lower strength than is here assigned to it, and 460 parts of distilled Vinegar, specific gravity 1006, required 20 parts of Carbonate of Potash for neutralization; the same quantity of distilled Vinegar would unite to 41.14 parts of Crystallized Carbonate of Soda; for 70 and 144 representing the atomic weights of dry Carbonate of Potash and crystallized Carbonate of Soda respectively, $70 : 144 :: 20 : 41.14$ nearly; and the latter quantity of Carbonate of Soda would consequently require 460 parts of such distilled Vinegar, or nearly eleven times its weight of this diluted acid for neutralization.

PROPERTIES, AND TESTS OF ITS PURITY.—It crystallizes in striated prisms, but is generally obtained in an amorphous mass. It should be perfectly white, and have a sharp and somewhat bitter taste. It is not deliquescent on exposure to air like the Acetate of Potash, and for this reason is preferable for medical use. It should dissolve readily in water, and the addition of Tartaric Acid should cause no deposit in the solution. Sulphuric Acid poured on the dry salt should produce a copious extrication of the vapours of Acetic Acid; and the mixture sufficiently diluted with water and evaporated, should afford minute crystals of Sulphate of Soda.

USES.—*Medicinal.* Nearly the same as those of Acetate of Potash: compared with this salt, it has the advantage of not deliquescing on exposure to air. Its dose can also be more easily apportioned: 34 parts of Acetate of Soda are equivalent to 29 of Acetate of Potash, both taken in their crystallized states; and 34 of Acetate of Soda to about 24 of Acetate of Potash prepared by the process of this Pharmacopœia.

DOSE.—From one to four scruples.

CARBONATE OF SODA.

Take of Barilla, reduced to powder, one part,
Water, two parts.

Boil the Barilla in the water during two hours in a covered vessel, occasionally stirring it. Strain the liquor and triturate what remains of the Barilla, and again boil it with the same quantity of water: let this be done three times. Let the filtered and mixed washings evaporate in an open iron vessel until the residue is dry, taking care, lest by too great an increase of heat, the remaining saline mass shall again liquefy. Let this be stirred with an iron rod until it shall have become white: finally dissolve in hot water, and let the liquor evaporate until it shall have attained the specific gravity of 1220, and let it be exposed to the air when the temperature approaches to that of freezing water, that by cooling crystals may form, which are to be dried and preserved in a stopped vessel. If the salt should not appear sufficiently pure, repeat its solution, and let crystals be again formed.

REMARKS.—Barilla, the fused ashes of maritime plants, is a very heterogenous compound, containing, with Carbonate of Soda, various other salts, consisting chiefly of Sulphate and Muriate of Soda; also, variable mixtures of Lime, Alumine, Silica, and some Metallic Oxides, together with a considerable quantity of water and charcoal. Some Hydrosulphurets are also present. Of these various ingredients, some are soluble in water, and by means of this fluid, the Carbonate of Soda and other soluble salts may be separated from the earthy and metallic compounds of the mixture. To obtain a separation

of the salts soluble in water from the Carbonate of Soda, crystallization is had recourse to; a solution of the mixed salts, when sufficiently concentrated and exposed to a low temperature, depositing crystals of the Carbonate of Soda. Dr. Perceval, formerly Professor of Chemistry in the University, ascertained that a solution of Carbonate of Soda will not afford crystals until its temperature approaches to 32° . It is therefore almost useless to endeavour to obtain crystals of this salt during summer. It is also difficult to render it perfectly pure by the process of crystallization, which should be many times repeated to detach completely from it the Muriate of Soda.

As the intention of this process is first to separate by means of water the soluble from the insoluble parts of the Barilla, it is directed that different portions of water shall be boiled on the pulverized ashes and poured off. By this proceeding, all saline matter soluble in water is completely extracted. For the evaporation of the liquors an iron vessel is directed, as it is capable of bearing the heat required to dry the residue. Evaporation to dryness is prescribed, for the purpose of decomposing the Hydrosulphurets. A caution is given not to increase the heat so much as to liquefy the saline product remaining from the evaporation; for this liquefaction would produce a hard and solid mass of difficult solution, and would also interfere with that whiteness which is produced by exposure to heat and the expulsion of extractive matter and Sulphur. It was ascertained by Dr. Perceval, that the density of the saline liquor, to fit it for the production of crystals, must be 1220; for, if it should be of an inferior density, the quantity of water present will be sufficient to hold the Carbonate of Soda in solution. As the salt is efflorescent, it should be kept in a close vessel, since if it be exposed to a dry atmosphere it gradually loses its water of crystallization, and becomes a white powder.

Carbonate of Soda is composed of

1 Soda	=	32
1 Carbonic Acid	=	22
10 Water	=	90
<hr/>		
1 Carbonate of Soda crystallized	=	144

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is pure white and its taste alkaline. It changes vegetable blue colours to green, and reddens paper tinged by turmeric. It dissolves readily in water, and crystallizes from the solution in forms derived from the oblique rhombic prism. One hundred parts of water dissolve about 50 parts of the salt at temperature 60°. On exposure to air it loses its water of crystallization, and effloresces. With the stronger acids it effervesces, giving off Carbonic Acid Gas, and neutralized by Nitric Acid the solution affords no precipitate with Acid of Tartar, Nitrate of Baryta, or Nitrate of Silver.

USES.—*Pharmaceutical.* In preparing Carbonate of Ammonia; Water of Carbonate of Soda; Bicarbonate of Soda; dried Carbonate of Soda; acidulous Water of Carbonate of Soda; Phosphate of Soda; Tartrate of Potash and Soda; precipitated Carbonate of Lime; Carbonate of Iron; compound Pills of Iron.

—*Medicinal.* To correct acidity of stomach, and in calculus of the bladder arising from Lithic Acid. In Scrofula it is also employed. It has been recommended in hooping cough, after proper evacuation of the bowels, at first conjoined with Ipecacuan and Opium, and when the cough has diminished in severity, with Peruvian bark.

USES.—*General.* In its impure state it is employed by the manufacturers of soap.

DOSE.—From ten grains to a drachm dissolved in water, and taken three times in the day.

WATER OF CARBONATE OF SODA.

Take of Carbonate of Soda any required quantity. Dissolve in water, and let the specific gravity of the liquor be to that of distilled water as 1024 to 1000. A liquor of the same specific gravity is prepared by dissolving an ounce of Carbonate of Soda in a pint of distilled water.

REMARKS.—This is a convenient form for a solution of Carbonate of Soda in water; each ounce measured containing half a drachm of the Carbonate of Soda. It is well adapted for internal use, either in its uncombined form, or for the saline effervescing draught with lemon juice; of which acid, half an ounce is neutralized by one ounce of the water of Carbonate of Soda.

The following table of the quantities of dried Carbonate of Soda and water, contained in solutions of this salt in water at different specific gravities, was constructed from experiments made by Dr. Abel at the laboratory of Trin. College, with the writer's inspection.

TABLE.

Specific gravity of solution.	Quantity of dry Carbonate of Soda in 100 parts of do.
1116	11.11
1105	10.00
1095	9.09
1085	8.33
1080	7.69
1075	7.14
1069	6.66
1065	6.25
1062	5.88
1059	5.55
1056	5.26
1053	5.00
*1050	*4.76
*1047	*4.52

Each ounce troy of *dry* Carbonate of Soda, is equivalent to 1280 grs. or 2 oz. 5 drs. 20 grains of the crystallized salt.

DOSE.—From three drachms to two ounces, sufficiently diluted with water, three times a day. In dyspeptic cases attended by acidity of stomach it is given with advantage combined with cold infusion of chamomile.

The numbers marked thus * were deduced from calculation.

BICARBONATE OF SODA.

Take of Carbonate of Soda two parts,

Water, five parts.

Dissolve.

Let the liquor be exposed in a suitable apparatus to the stream of Carbonic Acid Gas; which escapes during the solution of white marble in diluted Muriatic Acid; until it shall have ceased to absorb gas, and let it rest until crystals form: then with a heat not exceeding 120° , let the liquor evaporate and crystals be formed by cooling; these are to be mixed with the former, dried and preserved in a close vessel.

REMARKS.—Carbonate of Soda resembles Carbonate of Potash in retaining an attraction for an additional quantity of Carbonic Acid. Soda and Carbonic Acid unite in the following proportions:—one atom of Soda to one atom of Carbonic Acid; two atoms of Soda to three of Carbonic Acid; and one of Soda to two of Carbonic Acid. To prepare the last of these, is the object of the present process. The compounds of Soda with Carbonic Acid resemble those of Potash and this Acid; an increase of the quantity of Carbonic Acid affording a salt of inferior solubility in water; the Sesquicarbonate and Bicarbonate of Soda, like those of Potash, requiring much more water for solution than the Carbonates of these alkalies. For these reasons, if the Carbonate of Soda be dissolved in its proper quantity of water, and a stream of Carbonic Acid Gas made to pass through the liquor for a sufficient length of time, a Bicarbonate of Soda is formed, of which a great part separates in crystals.

The results, according to the atomic proportions, are here given.

Materials.

1 Soda	=	32	1 Carbonic Acid	
1 Carbonic Acid	=	22	Gas	= 22
10 Water	=	90		
<hr/>				
1 Carbonate of Soda	=	144		

Products.

1 Soda	=	32	8 Water, disengaged	= 72
2 Carbonic Acid	=	44		
2 Water	=	18		
<hr/>				
1 Bicarbonate of Soda	=	94		

PROPERTIES, AND TESTS OF ITS PURITY.—It should be perfectly white. Its taste feebly alkaline. It produces crystals so small and intermixed that it is difficult to determine their form. It requires eight times its weight of water for solution, according to Berthollet. See *Journal de Physique* for February 1807, p. 170. Its solution scarcely affects vegetable colours and some of the tests of an alkali, for example Turmeric, not at all. It effervesces strongly with Nitric Acid, and neutralized by this acid, it yields no precipitate with the Nitrate either of Baryta or of Silver, nor with Tartaric Acid. Every 94 parts of the salt during its union with Nitric Acid should lose 44 parts of its weight by escape of Carbonic Acid; or 46.8 parts nearly for every 100 parts of salt.

USES.—*Medicinal.* From its mild taste, it is well adapted to those cases in which the use of an alkaline

carbonate is indicated; and more soda can be taken into the stomach in this form than in that of ordinary carbonate.

Dose.—From 7 to 50 grains.

DRIED CARBONATE OF SODA.

Let the crystals of Carbonate of Soda be liquefied by heat in a Silver crucible and continually stirred until the water being expelled, the salt shall have become perfectly dry. Let the residual salt, triturated to powder, be preserved in close vessels.

REMARKS.—By exposure to heat, the water of crystallization is expelled from the Carbonate of Soda, the salt first undergoing aqueous fusion, and the water gradually evaporating. In an experiment made by Dr. Abel with the writer's inspection; for the purpose of determining the quantity of water of crystallization contained in crystallized Carbonate of Soda; 180 grains of this salt, on being heated, gave off 113 grains of water, a quantity differing only by half a grain or $\frac{1}{225}^{\text{th}}$ part from the quantity it should yield conformably with the supposition of its containing 10 atoms of water; for $144 : 90 :: 180 : 112.5$; and confirming the composition of this salt, so far as respects the quantity of its water of crystallization as determined by Dr. Thomson.

PROPERTIES, AND TESTS OF ITS PURITY.—Colour, snow white; dissolving readily in water, changing to green the infusion of blue cabbage, and reddening turmeric paper. Effervescing with the stronger acids and neutralizing them, and when saturated by Nitric or Acetic Acid, affording no precipitate with either the Nitrate of Silver, Nitrate of Baryta, or Tartaric Acid.

USES.—*Medicinal.* The dried Carbonate of Soda can easily be formed into pills, which, with the crystallized carbonate is done with difficulty. Pills composed of dried Carbonate of Soda united to Soap and aromatics, were recommended in calculous diseases by the late Dr. Beddoes of Bristol. This remedy is also useful in cases of acidity of stomach. In calculous diseases its benefits are limited to that species of calculus which is produced by Lithic Acid. As 144 parts of the crystallized Carbonate of Soda, and 54 parts of the dried salt, contain the same quantity of alkali; the dose of the dried carbonate must in quantity be much inferior to that of the crystallized, and in the proportion of the above numbers representing the atomic weights of the crystallized and dried carbonate respectively.

DOSE.—From about four to twenty-two and half grains.

Mr. Phillips states that from his examination, the salt met with in Commerce, under the name of Carbonate of Soda, of the London Pharmacopœia, and often under that of Supercarbonate of Soda, the Bicarbonate of Chemists, is composed of an atom of the carbonate and two atoms of the bicarbonate, and is consequently what has been termed a sesquicarbonate; as it contains one atom of soda united to one atom and half of Carbonic Acid. The salt, which is found native in Africa, named Trona or Natron, is of this kind.

ACIDULOUS WATER OF CARBONATE OF SODA.

Take of Carbonate of Soda any required quantity, dissolve it in water so that each pint shall contain a drachm of Carbonate of Soda. Then in an apparatus adapted to

retaining the gas, let the liquor be exposed to a stream of Carbonic Acid Gas, which bubbles forth during the solution of white marble in Muriatic Acid diluted with six times its weight of water; until Carbonic Acid is superabundant in the liquor.

REMARKS.—This is the process by which the preparation named Soda Water is manufactured. For producing the Carbonic Acid Gas, Muriatic is preferable to Sulphuric Acid, as the Sulphate of Lime which is formed by the latter acid, requiring much water for solution, collects around the marble and prevents the further action of the acid; for this reason the solution goes forward much more slowly with Sulphuric than with Muriatic Acid. The manufacturer of Soda Water employs the action of a condensing syringe to compress the Carbonic Acid into the water, which becomes so highly charged with the gas as to effervesce strongly when the pressure is removed. This preparation may be considered, as a Bicarbonate of Soda dissolved in water holding Carbonic Acid in solution.

PROPERTIES, AND TESTS OF ITS PURITY.—It should effervesce strongly when poured from the bottle immediately after removal of the cork. Should have an agreeable acidulous flavour. A little of the water evaporated to dryness, then heated pretty strongly during a few minutes, will yield Carbonate of Soda, which may be recognized by the properties already mentioned. A fraudulent imitation of this water has been practised by dissolving Carbonate of Soda in water contained in a bottle, adding a few drops of Sulphuric Acid, and instantly corking the bottle. This fraud may be detected by the addition of Muriate or Nitrate of Baryta, which will cause the precipitation of Sulphate of Baryta, which is known by its insolubility in any of the diluted acids. Still further, if Sulphuric Acid was added in quantity sufficient

to neutralize the soda, the salt obtained by evaporating the water will not effervesce with the stronger acids, and will have other properties of Sulphate of Soda.

USES.—*Medicinal.* An agreeable refrigerant drink, promoting the flow of urine; correcting acidity in the stomach, and obviating the tendency to the secretion of Lithic Acid by the kidneys.

DOSE.—From half a pint to a pint. The ordinary Soda Water of Commerce generally contains about half a drachm of Carbonate of Soda in the half pint.

PHOSPHATE OF SODA.

Take of Bone Ashes reduced to powder, ten parts,
Sulphuric Acid of Commerce, seven parts.

Mix the powder with the Sulphuric Acid in an earthen-ware vessel; gradually add seven parts of water and stir the mixture. Digest for three days, occasionally adding more water to prevent the mixture from becoming dry, and with continued stirring: then add seven parts of boiling water, and filter through a linen cloth, pouring on hot water by repeated additions until all the acid is washed out. Set the liquor apart that the dregs may subside, pour it off from the sediment and reduce it by evaporation to one half; then add of Carbonate of Soda dissolved in hot water eight parts; filter, and by alternate evaporation and cooling let crystals form, which are to be laid aside in a well stopped vessel. Should the salt not appear sufficiently pure, let it be redissolved and crystals again formed.

REMARKS.—The bones of animals consist of animal matter, composed chiefly of fat, gelatine, and cartilage,

united to various salts, consisting principally of Phosphate of Lime combined with small quantities of Carbonate of Lime, Carbonate of Soda, Phosphate of Magnesia and Sulphate of Lime. The Carbonate and Sulphate of Soda are probably formed during the calcination. In the above process, Phosphoric Acid is partially separated from Phosphate of Lime by Sulphuric Acid, and Sulphate of Lime is formed, which remains nearly undissolved, whilst a portion of the Phosphate of Lime, with a little Sulphate of Lime, is taken up and held in solution by the Phosphoric Acid. By washing the mixture with water, the Phosphoric Acid containing dissolved Phosphate of Lime is taken up, together with the greater part of the Sulphate of Lime. Other salts, produced in small quantity by the Sulphuric Acid, are also dissolved; these are Sulphate of Soda and Sulphate of Magnesia. By addition of Carbonate of Soda dissolved in water, the Phosphoric Acid is neutralized and Phosphate of Soda formed. On adding the Carbonate of Soda, a considerable quantity of Phosphate of Lime, which was held in solution by the Phosphoric Acid, is thrown down; this should be separated either by letting it subside, and decanting off the clear liquor, or by filtration. The Phosphate of Soda in crystals quite free from the foreign salts is then obtained, by sufficient evaporation and cooling of the liquor. These crystals are formed when the specific gravity of the solution arrives at about 1210, with sufficient reduction of temperature.

The changes in this case may be thus viewed, according to the atomic theory and the numerical representation of Phosphoric Acid at present adopted.

FIRST PROCESS.

Materials.

1 Phosphoric Acid	=	28	1 Sulphuric Acid	=	40
1 Lime	=	28	1 Water	=	9
		—			—
1 Phosphate of Lime	=	56	1 Liquid Sulphu- ric Acid	=	49
			100 Water	=	900
					—
			Total	=	949

Products.

1 Sulphuric Acid	=	40	1 Phosphoric Acid	=	28
1 Lime	=	28	99 Water	=	891
2 Water	=	18			—
		—	1 Liquid Phospho- ric Acid	=	919
1 Sulphate of Lime	=	86			

The actual results do not exactly correspond with the preceding statement, as the Phosphoric Acid dissolves some of the Phosphate of Lime, which is separated by addition of the Carbonate of Soda.

SECOND PROCESS.

Materials.

1 Phosphoric Acid	=	28	1 Carbonic Acid	=	22
99 Water	=	891	1 Soda	=	32
		—	18 Water	=	162
1 Liquid Phospho- ric Acid	=	919			—
			Carbonate of Soda in water	=	216

Products.

1 Phosphoric Acid	= 28	105 Water	= 945
1 Soda	= 32	1 Carbonic Acid Gas	= 22
12 Water	= 108		-----
	-----		967
Crystallized Phosphate of Soda	= 168		

In the above schemes the number 28 has been adopted as representing Phosphoric Acid. The writer, however, thinks it proper to adduce the result of an experiment made by him to determine the quantity of Carbonate of Lime equivalent to a known weight of Phosphate of Lime, with the view to ascertain the quantity of Sulphuric Acid requisite for decomposition of Phosphate of Lime. Two equal quantities of the same solution of Muriate of Lime were taken: of these, one was decomposed by a solution of Carbonate of Soda; the other by a solution of Phosphate of Soda; each being added in excess. The precipitates were collected on filters, carefully washed, and dried with a heat approaching to redness. The Carbonate of Lime weighed 42.12, the Phosphate of Lime 58. Each of these contained the same quantity of Lime, viz. 23.5; for the neutralization of which by liquid Sulphuric Acid, 41.1 parts of that acid are required. The Phosphate of Lime as above given, requires the same quantity of Sulphuric Acid, and consequently 10 parts of Phosphate of Lime will require 7 parts very nearly of liquid Sulphuric Acid; for $58 : 41.1 :: 10 : 7.08$. On this experiment was founded the proportion of bone ashes to Sulphuric Acid, as directed in this Pharmacopœia. If the equivalent quantities of Phosphate and Carbonate of Lime be correctly ascertained by the above experiments, it also follows that the number hitherto ap-

plied to express the atomic weight of Phosphoric Acid, viz. 28, is incorrect, for, according to the preceding determination, 23.5 of Lime unite to 34.5 of Phosphoric Acid, and $23.5 : 34.5 :: 28 : 41.1$ nearly.

In preparing this salt it is found that the crystallization is insured by using an excess of the alkali. In an experiment made by me, one pound of Bone Ashes digested with eight-tenths of its weight of strong Sulphuric Acid, and the resulting acid liquor supersaturated by Carbonate of Soda, for which purpose 1 lb. 7 oz. of this salt were required, yielded 1 lb. 3 oz. of well crystallized Phosphate of Soda.

PROPERTIES, AND TESTS OF ITS PURITY.—Colour snow white. It yields crystals, of which the primitive form is an oblique prism with a rhomboidal base. These dissolve in somewhat more than five times their weight of water at temperature 60° , the writer having found this salt to be less soluble in water than it is generally stated to be. It should not effervesce on the addition of an acid. Its solution is decomposed by the neutral Salts of Lime, and Phosphate of Lime is thrown down, which may be dissolved by Nitric or Muriatic Acid. It is decomposed by most metallic solutions, provided that an excess of acid is not present, and a Phosphate of the metallic Oxide is precipitated. With Nitrate of Baryta and Nitrate of Silver it should afford precipitates soluble in Nitric Acid.

USES.—*Medicinal.* It has a purgative quality, and compared with other saline purgatives, the salt possesses the advantage of having but little taste. It can be given dissolved in light broth, in which case it can scarcely be distinguished from broth seasoned with common salt; but since Phosphate of Soda, as it is usually prepared, often contains an excess of alkali, this may be neutralized by addition of a little Lemon Juice.

DOSE.—The principal objection to its use is, that to be effectual, it must be taken in a larger dose than other saline purgatives; the quantity, from one to two ounces dissolved in some proper fluid.

SULPHATE OF SODA.

Let the salt which remains after the distillation of Muriatic Acid be dissolved in a sufficient quantity of hot water. Put aside the filtered liquor, that after due evaporation crystals may be formed by slow cooling.

REMARKS.—The salt remaining in the retort at the end of the process which yields Muriatic Acid, is Sulphate of Soda, the Glauber's Salt of Commerce. It can be extracted from the retort with hot water, and the solution, when sufficiently concentrated, on cooling, deposits crystals. To have the crystals free from insoluble impurities, filtration is directed; and that the crystals may form of large size, the cooling of the liquor should be *slow*.

Sulphate of Soda is composed of

1 Sulphuric Acid	=	40
1 Soda	=	32
10 Water	=	90
<hr/>		
1 Crystallized Sulphate of Soda	=	162

PROPERTIES, AND TESTS OF ITS PURITY.—It is white, and efflorescent on exposure to a dry atmosphere; its crystals have the form of striated six-sided prisms, the primary form of the crystal being an oblique rhombic prism. On application of heat it liquefies in its water of crystallization. One hundred parts of water at the temperature of 60° , hold in solution about 39 parts of the crystallized salt, and at the temperature of 212° about 90 parts. According to Dr. Ure's experiments, the solubility of Sulphate of Soda follows a very singular law; "after having increased rapidly to about the temperature of 33° , centigrade, $= 91.4^{\circ}$ Far., where it is at its maximum, it diminishes to $103.17^{\circ} = 217.7^{\circ}$ Far. and at that point it is nearly the same as at $30.5^{\circ} = 86.9^{\circ}$ Far." —See Chemical Dictionary, p. 687. Ed. 3d. Its aqueous solution gives an abundant precipitate with any of the soluble salts of Baryta, but is not made turbid by the Acid of Tartar.

Sulphate of Soda, as prepared from the residue obtained in the preparation of bleaching salt, often contains Sulphate of Manganese; this impurity is detected by addition of Water of Caustic Potash, which causes a cream-coloured deposit, assuming in the course of a few minutes a brown colour.

USES.—*Medicinal.* Much used as a purgative, but more disagreeable to the taste than Sulphate of Magnesia. Its operation is promoted by copious dilution. When the salt has effloresced, it is obvious from the above statement of its composition, that its dose must be diminished in the proportion of 9 to 4.

TARTRATE OF SODA AND POTASH.

Take of Carbonate of Soda five parts,
Bitartrate of Potash, reduced to the finest
powder, seven parts,
Hot water, fifty parts.

To the Carbonate of Soda dissolved in water gradually add the Bitartrate of Potash; let the liquor filtered through paper evaporate, and set it aside that, by slow cooling, crystals may be formed.

REMARKS.—By this process the superabundant acid of the Bitartrate of Potash is neutralized by Soda and a triple salt formed. The quantities of the salts requisite for mutual saturation were determined experimentally: in the first experiment 10 parts of Carbonate of Soda, dissolved in 80 parts of water, required 13.5 parts of Bitartrate of Potash; in the second, 14 parts of this Bitartrate, for neutralization, the mean of these experiments exactly agreeing with the atomic representation of the requisite quantities.

In conducting this process the Bitartrate of Potash should be minutely pulverized to promote its action on the Carbonate of Soda. It should also be added gradually, as a strong effervescence takes place. The filtered solution should be evaporated to the proper degree of concentration to afford crystals on cooling.

The processes of the different colleges stand thus :

PROCESSES.	Quantity of Carbonate of Soda.	Do. of Bitartrate of Potash.
Dublin Pharmacopœia of 1807,	10	12
Dublin do. of 1826,	10	14
London do.	10	12
Edinburgh do. . . .	10	30
Pharmacopœia Gallica of 1818.	10	12.5

The atomic combining quantities are represented in the following scheme :

Materials.

1 Potash	= 48	1 Soda	= 32
2 Tartaric Acid	= 132	1 Carbonic Acid	= 22
2 Water	= 18	10 Water	= 90
<hr/>		<hr/>	
1 Bitartrate of Potash	= 198	1 Crystallized Car-	
		bonate of Soda	= 144

Products.

2 Tartaric Acid	= 132	1 Carbonic Acid Gas	= 22
1 Potash	= 48	4 Water	= 36
1 Soda	= 32		—
8 Water	= 72		58

1 Tartrate of Soda and Potash	= 284
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The compound is sometimes represented as formed of Tartrate of Potash and Tartrate of Soda, in which case its composition will be

1 Tartrate of Potash	= 114
1 Tartrate of Soda	= 98
8 Water	= 72
<hr/>	
1 Tartrate of Soda and Potash	= 284

From the preceding statements it is evident that in the process as directed in the Edinburgh Pharmacopœia, there is a great waste of the Bitartrate of Potash.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is pure white, and it forms permanent crystals of great size and regularity, often in the form of eight-sided prisms with flat terminations at right angles to the axis of the prism; and the crystal frequently appears as it were bisected by a plane passing through the axis of the prism, and the face on which this half prism rests presents two diagonal lines crossing in the centre. It dissolves in five times its weight of water at the tempera-

ture of 60° , and in less water at the boiling temperature. Exposed to heat it fuses, and by continuance of heat becomes black. The residuum mixed with water, filtered, and examined by proper reagents, appears to contain both Potash and Soda. The solution of the Tartrate of Soda and Potash in water, is decomposed by the neutral soluble Salts of Lead, and also by Tartaric Acid, which throws down Bitartrate of Potash: with the soluble Salts of Baryta and of Silver, it affords precipitates soluble in Nitric Acid.

USES.—*Medicinal.* It is a mild purgative. It was long known under the name of Rochelle Salt, because first made by M. Seignette, an Apothecary at Rochelle. In the London Pharmacopœia it is named Soda Tartarizata, but it contains Potash as well as Soda. The powders sold under the name of SODAIC POWDERS, produce on mixture what is properly named Tartrate of Soda. An effervescing laxative draught is prepared by mixing crystallized Carbonate of Soda and Tartaric Acid, of which these powders are composed; and the Alkali and Acid should be used in the proportion of 24 to 11, or half a drachm of Carbonate of Soda to about 14 grains of crystallized Tartaric Acid.

DOSE.—From one ounce to an ounce and half dissolved in water. It can be conveniently combined with Emetic Tartar without any decomposition of either salt.

SECTION V.

EARTHY SALTS.

DRIED ALUM.

Take of Alum any requisite quantity.

Let it be exposed to heat in a vessel of earthen ware until it ceases to boil up; then let it be reduced to powder.

REMARKS.—In this process, the water of crystallization of the alum is expelled and the dried salt remains. The activity of the salt as an external application is much increased by the expulsion of its water of crystallization. The heat should not be long continued or the acid will be partially decomposed and expelled; the earthy and alkaline bases of the salt remaining united to some Sulphuric Acid; and the residue will be found to be almost wholly insoluble in water.

According to the experiments of Dr. Thomson, alum is composed of

1 Sulphate of Potash	=	88
3 Sulphate of Alumina	=	174
25 Water	=	225

1 Crystallized Sulphate of Alumina and Potash or Common Alum	}	= 487
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Dried Alum should therefore be composed of

1 Sulphate of Potash	= 88
3 Sulphate of Alumina	= 174
	—
1 Dried Alum	= 262

PROPERTIES, AND TESTS OF ITS PURITY.—The taste of alum is strongly astringent. It suffers no change from exposure to the air. Its solubility in water is variously stated. According to some authors it dissolves in five times its weight of water at 60°, other authors assert that it requires twelve or even twenty times its weight of water for solution. It is much more soluble in hot water, dissolving in its own weight or less, of water at 212°. The solubility is greatly diminished by the process of drying. From its hot saturated solution it crystallizes on cooling, in the regular octaedron or in modifications of this form. It contains an excess of acid and reddens litmus paper. On exposure to heat, alum swells up, parts with its water of crystallization, and becomes a white brittle mass. A strong heat deprives it of part of its acid, which is also decomposed. Its solution in water gives an abundant insoluble precipitate, with a solution either of Baryta or of any of its salts. Potash, Soda, or Ammonia added to a watery solution of alum, throws down from it the alumina in form of a white light powder, which is redissolved by the fixed alkalies. Ammonia or Carbonate of Ammonia produces no effect on this precipitate. Other compounds much resembling alum, but containing ammonia as the alkaline base, are occasionally met with, but the Sulphate of Alumina and Potash is the most common.

USES.—*Medicinal.* It is sometimes applied externally as a mild escharotic. Crystallized alum is found a use-

ful astringent in cases of hemorrhage from the stomach, intestines, or uterus. It has also been recommended as an internal remedy in cases of colic, in which disease it gently moves the bowels and relieves the pain.

DOSE.—Of crystallized alum, when given as an astringent, from five to ten grains: when given in colic, its dose should amount to twenty grains.

MURIATE OF BARYTA.

Take of Sulphate of Baryta, ten parts,

Charcoal reduced to the most subtile powder,
or of Lampblack, one part.

Let the Sulphate of Baryta be roasted in the fire, and whilst red hot thrown into water; then let it be reduced to the finest powder, in the manner directed for PREPARED CHALK. Let the powders, intimately mixed together, be passed into a crucible and exposed to a strong heat until they become red hot, during four hours. Let the mass when cold be dissolved in a quantity of boiling distilled water, amounting to ten times the weight of the Sulphate of Baryta, and let the liquor be filtered. To this add, avoiding the vapours, as much Muriatic Acid as may be sufficient to saturate the Baryta. Then let the liquors be filtered, from which by evaporation and cooling let crystals be formed.

REMARKS.—The object of this process is to unite Baryta to Muriatic Acid, for which purpose Sulphate of Baryta, the Heavy Spar of mineralogists, a pretty abundant natural product, is employed. For detaching the

Sulphuric Acid from the Baryta, the process here directed is cheap and easily performed. The Sulphuric Acid from the attraction of Charcoal for Oxygen aided by heat, is resolved into its elementary constituents. The Carbon uniting to the Oxygen passes off in form of Carbonic Acid and Carbonic Oxide Gases, and the Sulphur remains united to the Baryta. This compound passed into boiling hot water is almost totally dissolved. Some of the water is however decomposed, and Sulphate or Sulphite of Baryta produced, together with Sulphuretted Hydrogen, which attaches itself to the Baryta. Of the latter compound a large part separates in minute crystals on the cooling of the liquor. Muriatic Acid added to the liquor containing these crystals, causes an effervescence from extrication of Sulphuretted Hydrogen and Sulphurous Acid Gases, the mixture becoming turbid by deposition of Sulphur. The Acid should be added until the Baryta is saturated. The liquor is then to be filtered and evaporated until crystals form on cooling.

Materials.

1 Sulphur = 16	}	= 1 Sulphuric Acid = 40	2 Carbon = 12
3 Oxygen = 24			
		1 Baryta = 78	
<hr/>			
1 Sulphate of Baryta = 118			

Products.

1 Sulphur = 16	1 Carbon = 6	} 1 Carbonic
1 Baryta = 78	2 Oxygen = 16	
		Acid = 22
	1 Carbon = 6	} 1 Carbonic
1 Sulphuret of	1 Oxygen = 8	
Baryta = 94		Oxide = 14
		<hr/>
		Total = 36

The gaseous products are stated from theory, and the result is more complicated than it is here represented, as some Sulphuretted Hydrogen is produced which attaches itself to the Baryta. In an experiment made by the writer, the decomposition of the Sulphate of Baryta was much promoted by the addition of a little olive or any other fixed oil to the mixture.

PROPERTIES, AND TESTS OF ITS PURITY.—It crystallizes in the form of flat rectangular plates bevelled at the edges. The primitive form is a four-sided prism with square bases. It dissolves in less than three times its weight of water, at the temperature of 60° , and in less than twice its weight of water at the temperature of 212° . It is insoluble in Alcohol. Its solution in water is not discoloured by the Hydrosulphuret of Ammonia. It affords an abundant precipitate with an Alkaline Carbonate, the Nitrate or Acetate of Silver, with Sulphuric Acid, or with any sulphate.

It is composed as follows :

1 Chlorine	=	36
1 Barium	=	70
2 Water	=	18
<hr/>		
1 Crystallized Muriate of Baryta	=	124

This salt might be prepared by dissolving Carbonate of Baryta in Muriatic Acid sufficiently diluted, and by evaporating the liquor, but the Carbonate is a rarer and of course more expensive substance than the Sulphate of Baryta.

USES.—*Pharmaceutical.* For the preparation of the Water of Muriate of Baryta.

—*Medicinal.* In its solid form it is not applied to medical use.

WATER OF MURIATE OF BARYTA.

Take of Muriate of Baryta, one part,
Distilled water, three parts,
Dissolve.

Let the specific gravity of this liquor be 1230.

REMARKS.—A quantity of water, equal to three times the weight of the salt, is sufficient to dissolve and hold in solution the Muriate of Baryta. A solution thus prepared has the specific gravity of 1230, and by adjusting the specific gravity either by addition of salt or of water, as the case may require, the solution may be obtained of the proper degree of strength; as any inaccuracy in proportioning the quantity of water to that of salt, is discoverable by examination of the specific gravity. That the solution should be carefully prepared is of much consequence, as it is a very active preparation.

PROPERTIES, AND TESTS OF ITS PURITY.—These are given under the head of Muriate of Baryta.

USES.—*Medicinal.* Its internal use has been recommended in scrofula and in some tumours. It is also supposed to possess vermifuge properties, and, as Dr. A. Duncan informs us, it has been used externally as a stimulating and gently escharotic application in cutaneous diseases, fungous ulcers, and specks on the cornea. Taken internally in an over dose it is an active poison, producing inflammation of the mucous membrane of the stomach, with its usual consequences, convulsions and death. It acts as a poison also when applied externally to a raw surface, either in solution or in a dry state. The proper antidotes to this poison, when swallowed, are the Sul-

phates of Soda or Magnesia; by these salts the Muriate of Baryta, becomes Sulphate of Baryta, which is innocuous.

DOSE.—From five to ten grains *by measure*, sufficiently diluted with distilled water.

MURIATE OF LIME.

Take of the liquor which remains after the distillation of the water of Caustic Ammonia any requisite quantity : filter the liquor, and expose it in an open vessel to heat until the Muriate of Lime becomes perfectly dry. Let it be preserved in a vessel completely closed.

REMARKS.—The fixed product of the process which affords Water of Caustic Ammonia, is an aqueous solution of Muriate of Lime containing both adhering Ammonia and an excess of Lime. By evaporating the liquid part of the residue to dryness, the Ammonia is detached. The excess of Lime in this last product may be removed by redissolving the dry mass in water, and adding to the solution, Muriatic Acid until the Lime is neutralized ; by a second evaporation carried to dryness, and the application of sufficient heat, a perfect Chloride of Calcium is obtained. The composition is

1 Chlorine	=	36
1 Calcium	=	20
		—
1 Chloride of Calcium	=	56

PROPERTIES, AND TESTS OF ITS PURITY.—When water, in small quantity, is poured on the Chloride of Calcium, much heat is evolved, and it becomes Muriate

of Lime. It is very soluble in water. Its concentrated solution sufficiently evaporated and exposed to a temperature not much exceeding 40° or 50° , affords regular crystals in form of six-sided prisms, resembling the crystals of Sulphate of Soda. In a trial made by the writer, the solution in which regular crystals of Muriate of Lime had formed was of specific gravity 1412, at temperature 58° . These crystals had formed on the 19th April, in the Laboratory of Trinity College.

According to Dr. Thomson's analysis, the crystals are composed of

1 Muriatic Acid	=	37
1 Lime	=	28
6 Water	=	54
<hr/>		
1 Crystallized Muriate of Lime	=	119

The taste of this salt is acrid and peculiar. Either dry Chloride of Calcium or the crystallized Muriate of Lime strongly attracts water, and deliquesces when exposed for a sufficient time to the atmosphere; for this reason the salt should be kept in well stopped vessels. The solution of this salt in water gives no turbidness with Hydrosulphuret of Ammonia. The addition of an Alkaline Carbonate dissolved in water causes immediate turbidness, from separation of Carbonate of Lime. It is also rendered turbid by Oxalate of Ammonia and Nitrate of Silver, showing the presence of Lime and Muriatic Acid.

USES.—*Pharmaceutical*. It is used to prepare the water of Muriate of Lime, and to deprive ardent spirits of water in the preparation of Alcohol.

WATER OF MURIATE OF LIME.

Take of Muriate of Lime, two parts,
Distilled Water, seven parts.
Dissolve.

Let the specific gravity of the liquor be to the specific gravity of distilled water as 1202 to 1000.

REMARKS.—In this preparation, Muriate of Lime reduced to perfect dryness, in the state of what is named Chloride of Calcium, is directed. The solution is made of the same strength as that prescribed in the Pharmacopœia of 1807. This was experimentally ascertained, by dissolving to saturation, Carbonate of Lime in diluted Muriatic Acid, determining the specific gravity of the solution, and then finding the relative quantities of dry Muriate of Lime (Chloride of Calcium) and water, to be combined in order to form a solution of a specific gravity the same as that prepared with the Carbonate of Lime. It was found that Chloride of Calcium and water united in the proportion of 2 : 7, gave a liquor of the same specific gravity as that prepared by the process directed in the Pharmacopœia of 1807. The proportion of 2 : 7 in the quantities of Chloride of Calcium and Water, was therefore adopted in the Pharmacopœia of 1826.

PROPERTIES, AND TESTS OF ITS PURITY.—These are given under the preceding head of Muriate of Lime. The solution of Muriate of Lime prepared by the process here given, is free from colour, but that prepared according to the process of 1807 has a yellowish brown tinge, from the presence of a minute quantity of Oxide of Iron.

USES.—*Pharmaceutical.* To prepare Precipitated Carbonate of Lime.

—*Medicinal.* In scrofulous and glandular diseases.

DOSE.—From one to two drachms *measured*, sufficiently diluted with water. In large dose it probably acts as a poison.

This solution of Muriate of Lime is much more diluted than that directed in the Pharmacopœias of London and Edinburgh. The proportion which the dry Muriate or Chloride of Lime bears to the water, according to the forms directed by the different Colleges, is as follows :

COLLEGES.	CHLORIDE of LIME.	WATER.
London ..	100	126
Edinburgh ..	100	207
Dublin ..	100	334

The principles on which the calculation of the above quantities is founded are, the proportion which the quantities of Chloride of Lime and water, as employed, obviously bear to each other : the quantity of dry Chloride of Lime produced by a certain quantity of Muriatic Acid Gas ; and that of the water decomposed by the Chloride of Calcium during its change into Muriate of Lime.

PRECIPITATED CARBONATE OF LIME.

Take of water of Muriate of Lime, five parts,
 Add, of Carbonate of Soda, dissolved in four times its
 weight of distilled water, three parts.

Let the precipitate be mixed with water and suffered
 to subside, and let this operation be three times repeated
 with a sufficiently large quantity of water: lastly, when
 collected, let the powder be dried on a chalk stone or
 on paper.

REMARKS.—The Carbonate of Lime is in this case
 produced by an exchange of principles which takes place
 between the Muriate of Lime and Carbonate of Soda;
 the Muriate of Soda remaining dissolved in the water,
 and the Carbonate of Lime, from its insolubility, separat-
 ing and falling down. This decomposition, and the quan-
 tities of the different ingredients in the mixture, are thus
 represented:

Materials.

1 Muriatic Acid	= 37	1 Carbonic Acid	= 22
1 Lime	= 28	1 Soda	= 32
	—	10 Water	= 90
1 Muriate of Lime	= 65		—
		1 Crystallized Car- bonate of Soda	= 144

Products.

1 Muriatic Acid	= 37	1 Carbonic Acid	= 22
1 Soda	= 32	1 Lime	= 28
10 Water	= 90		—
	—	1 Carbonate of Lime	= 50
1 Muriate of Soda	= 159		

The quantities of the water of Muriate of Lime and crystallized Carbonate of Soda, should be adjusted to each other in the proportion as above given; and as 9 parts of water of Muriate of Lime would require 5.14 of crystallized Carbonate of Soda for decomposition, 5 parts of the same solution should take 2.85, or nearly 3 parts of crystallized Carbonate of Soda; the quantities directed in the present Pharmacopœia. It is evident from this statement, that an inconsiderable quantity of Carbonate of Soda remains undecomposed in the liquor. To free the precipitated Carbonate of Lime from adhering Muriate or Carbonate of Soda, the precipitate should be suffered completely to subside, the supernatant liquor decanted off, and a large quantity of water added and well shaken with the Carbonate of Lime; and after a second subsidence the same process repeated. This should be done until the decanted fluid ceases to become turbid on addition of either Muriate of Lime or Carbonate of Soda; and if great purity in the precipitate is desired, the presence of any adhering Muriate in the washings may be detected by addition of Nitrate of Silver. The precipitate may be dried by exposing it to the air in a warm situation, as in a stove, or on a sand-bath; and the dissipation of adhering moisture will be accelerated by placing the filter with its contents on a block of Chalk.

PROPERTIES, AND TESTS OF ITS PURITY.—It should be of a pure white colour, and remain dry on exposure to air. It should rapidly dissolve with strong effervescence in either Nitric, Muriatic, or Acetic Acids; or in distilled Vinegar; 50 parts of it losing, by expulsion of Carbonic Acid Gas, nearly 22 parts. Its solution in any of the acids above mentioned, when made neutral, should become turbid on adding a solution of any Alkaline Carbonate, or of Oxalate of Ammonia.

USES.—*Pharmaceutical.* In the preparation of Mercury with chalk.

—*Medicinal.* To correct acidity, and in diarrhœa, when all irritating matter has been removed by previous evacuation.

DOSE.—From ten grains to a drachm.

PREPARED CHALK.

Take of Chalk any required quantity.

In an earthen-ware mortar with the addition of a little water, let it be triturated to powder, and by stirring it, let this be mixed with a sufficiently large quantity of water; then, after a short delay; for the purpose of letting the coarser parts to subside; pour off the liquor. This operation is to be frequently repeated. The very subtile powder, which has fallen down in the effused liquor, is to be collected and dried on a bibulous stone, or on paper.

REMARKS.—Chalk, in different specimens, exhibits different degrees of purity. The kind named grey Chalk, is less pure than white Chalk. The impure kinds often contain siliceous particles, diffused irregularly through the mass, and sometimes two per cent of Alumine. By the process of elutriation here directed, the Chalk is obtained in very fine powder.

PROPERTIES, AND TESTS OF ITS PURITY.—It should be white, and in form of an impalpable powder, and should have the properties above assigned to Carbonate of Lime, under the head of precipitated Carbonate of Lime.

USES.—*Pharmaceutical.* For preparation of Chalk mixture; compound powder of Chalk; compound powder of Chalk with Opium; and of Aromatic confection.

USES.—*Medicinal.* The same as those of the precipitated Carbonate of Lime. It is sometimes used as an external application to ulcers, for the purpose of absorbing the fluid secreted from their surface, and in the same manner to burns, to promote the skinning of the sore.

DOSE.—From ten grains to a drachm.

PRECIPITATED PHOSPHATE OF LIME.

Take of Bones burnt and reduced to powder, one part,
Diluted Muriatic Acid,
Water, of each two parts.

Digest them together during twelve hours, and filter the liquor: add to this, of water of Caustic Ammonia as much as may be sufficient to throw down the Phosphate of Lime. Let this be washed with a sufficiently large quantity of water, and then dried.

REMARKS.—By this process Phosphate of Lime is obtained pure, and in very minute division, which probably facilitates its solution or absorption when taken into the Stomach. The animal matter of the bones is decomposed by heat, and the residual Phosphate and Carbonate of Lime are separated from the Charcoal by Muriatic Acid. The solution of these salts is promoted by heat and frequent agitation. In this case Ammonia throws down Phosphate of Lime only; any Lime that may be present being held in solution, from its superior attraction for Muriatic Acid. The precipitate should be washed so as to detach all adhering Muriate of Ammonia.

Materials.

1 Lime	=	28	1 Ammonia	=	17
1 Phosphoric Acid	=	28			
1 Muriatic Acid	=	37			
		—			
Total	=	93			

Products.

1 Muriatic Acid	=	37	1 Phosphoric Acid	=	28
1 Ammonia	=	17	1 Lime	=	28
		—			—
1 Muriate of Ammonia	=	54	1 Phosphate of Lime	=	56

PROPERTIES, AND TESTS OF ITS PURITY.—Its appearance is that of a powder, of a pure white colour. It dissolves quickly in Nitric, Muriatic, or Acetic Acids, and is separable from these acids by addition of Ammonia. To these characters may be added a property observed by the writer, that the solution of Phosphate of Lime in Acetic Acid becomes turbid when mixed with an aqueous solution of the Acetate of Lead.

USES.—*Medicinal.* It is given in Rickets; and in combination with small quantities of Carbonate of Iron, with advantage.

DOSE.—From three grains to half a drachm.

CARBONATE OF MAGNESIA.

Take of Sulphate of Magnesia, twenty-five parts,
Carbonate of Potash, twenty-four parts,
Boiling water, four hundred parts.

Let the Sulphate of Magnesia and Carbonate of Potash be dissolved each in two hundred parts of water. Let the depurated liquors be mixed. Boil the mixture for a short time, and filter it whilst warm through an extended cloth adapted to collecting the Magnesia. Let the Sulphate of Potash be washed off by the repeated affusion of hot water: lastly, let the Carbonate of Magnesia be dried.

REMARKS.—Carbonate of Magnesia is produced by a double exchange of principles which takes place between the Sulphate of Magnesia and Carbonate of Potash. Hot water is directed to be used for the purpose of facilitating the solution of the salts previous to their commixture, and to diminish time, labour, and expense. Filtration of the liquors is directed in order to insure a purity of product. Should the Carbonate of Potash contain any Bicarbonate of this Alkali, Bicarbonate of Magnesia would be formed, which as it is less soluble in hot than in cold water, would be precipitated from the mixed liquors; but if the liquors were mixed when cold, a great part of the latter salt would remain in solution and be lost. For this reason the mixture is directed to be boiled. To collect the precipitated Carbonate of Magnesia, a cloth is directed: paper cannot be used for this purpose, as its pores become closed with the precipitate, and the liquor cannot pass through. For solution of the salts,

hard water, containing Salts of Lime, should be avoided, as such water on its admixture with the Carbonate of Potash would afford Carbonate of Lime. Water containing any Salt of Iron should also be carefully avoided, as the precipitated Oxide of Iron would discolour the Carbonate of Magnesia. For washing off the Sulphate of Potash hot water should be employed, as the salt requires much water for solution, and is more soluble in hot than in cold water. The precipitated Carbonate of Magnesia often contains Silica, which is always present in the Carbonate of Potash of Commerce.

Materials.

1 Sulphuric Acid =	40	1 Potash =	48
1 Magnesia =	20	1 Carbonic Acid =	22
7 Water =	63	109 Water =	981
<hr/>		<hr/>	
1 Crystallized Sulphate of Magnesia =	123	Total =	1051
109 Water =	981		
<hr/>			
Total =	1104		

Products.

1 Sulphuric Acid =	40	1 Magnesia =	20
1 Potash =	48	1 Carbonic Acid =	22
225 Water =	2025		—
<hr/>		1 Carbonate of Mag-	
Solution of Sul-		nesia =	42
phate of Potash =	2113		

It appears as a finer powder when prepared with cold than with hot water.

PROPERTIES, AND TESTS OF ITS PURITY.—It is a white, subtile, and nearly tasteless powder. It is dissolved readily and with effervescence in diluted Sulphuric Acid, and this solution, when neutral, should not be discoloured or made turbid by the Hydrosulphuret or Oxalate of Ammonia. Its solution in diluted Nitric Acid, should remain transparent on the addition of Nitrate, Muriate, or Acetate of Baryta. It contains variable quantities of water accordingly as it has been more or less exposed to the air.

USES.—*Pharmaceutical.* In the preparation of Mercury with Magnesia.

—*Medicinal.* To correct acidity of stomach, and as a mild purgative. To produce the latter effect, an acid should be present in the stomach or bowels. It is a useful remedy in lithic acid calculus of the bladder, or in cases where there appears a disposition to that disease. The Carbonate of Magnesia dissolves more readily than Magnesia in the weaker acids, and is therefore better adapted to correct acidity of stomach or bowels, where the extrication of Carbonic Acid Gas from the salt does not produce flatulent distention.

PURE SULPHATE OF MAGNESIA.

Take of Commercial Sulphuric Acid, twenty-five parts,
Water, one hundred parts,
Carbonate of Magnesia, twenty-four parts, or
as much as may be sufficient to saturate
the Acid.

Let the Sulphuric Acid and water be mixed, then let the Carbonate of Magnesia be gradually added. Lastly,

let the filtered liquor evaporate, that crystals may be formed on its cooling.

REMARKS.—Sulphate of Magnesia, as it occurs in Commerce, is sometimes impure. The Editors of the Dublin Pharmacopœia have thought it right to point out the mode by which this salt may be obtained in its perfect state. Carbonate of Magnesia dissolves in diluted Sulphuric Acid with effervescence; the cessation of which, on addition of the Carbonate, indicates the neutralization of the Sulphuric Acid by the Magnesia. The exact quantity of Carbonate of Magnesia of Commerce requisite for this purpose cannot be accurately determined, as Carbonate of Magnesia contains variable quantities of water.

Materials.

1 Magnesia	= 20	1 Liquid Sulphuric	
1 Carbonic Acid	= 22	Acid	= 49
1 Water	= 9	22 Water	= 198
	—		—
1 Carbonate of Mag-		Total Acid and	
nesia	= 51	Water	= 247

Products.

1 Sulphuric Acid	= 40	17 Water, evapo-	
1 Magnesia	= 20	rated	= 153
7 Water	= 63	1 Carbonic Acid	
	—	Gas	= 22
1 Sulphate of Mag-			—
nesia	= 123	Total	= 175

PROPERTIES, AND TESTS OF ITS PURITY.—It crystallizes in the form of perfectly white and transparent tetra-

hedral prisms with dihedral summits of a saline and bitter taste. These crystals are permanent in air. The crystallized salt dissolves in less than its weight of water at the temperature of 60° , and in about two-thirds of its weight of boiling water. Exposed to heat it undergoes aqueous fusion, and gives off the water of crystallization. The solution is decomposed by the soluble salts of Baryta and by the fixed Alkalies: 123 parts of the crystallized salt should afford, according to the above scheme, 20 parts of dried Magnesia. By this experiment the adulteration with Sulphate of Soda, which is not unfrequently practised, may be detected.

USES.—*Pharmaceutical.* In the preparation of Carbonate of Magnesia it may be used, but for this purpose the commercial Sulphate of Magnesia, which is directed in the *Materia Medica*, being less costly, is preferred.

—*Medicinal.* It is used as a purgative. It is less frequently rejected by the stomach than most other saline purgatives: this property it may derive from its bitterness. The purgative action of Sulphate of Magnesia, as of most other saline purgatives, is much promoted by copious dilution with water. It is more mild in its operation than resinous purgatives. The secretions of sweat and urine, are promoted by Sulphate of Magnesia, according to the circumstances in which the patient is placed as to covering and warmth.

DOSE.—From one drachm to one ounce, dissolved in water and sufficiently diluted with this fluid; the purgative action of the salt being much increased by dilution.

SECTION VI.

SULPHUREOUS PREPARATIONS.

HYDROSULPHURET OF AMMONIA.

Take of Sulphuret of Iron, reduced to a coarse powder,
five parts,
Sulphuric Acid, seven parts,
Water, thirty-two parts,
Water of Caustic Ammonia, four parts.

Pass the Sulphuret into a retort, then gradually pour on it the acid, first diluted with water, and in a suitable apparatus cause the elastic fluid to pass through the Water of Ammonia. Toward the end of the process, apply a moderate heat to the retort.

REMARKS.—To produce the union of Ammonia with Sulphuretted Hydrogen, which is an acid, is the object of this process. Two operations are at the same time going forward. In the first, the decomposition of water and Sulphuret of Iron, by which Sulphuretted Hydrogen Gas and Sulphate of Iron are formed; in the second, the combination of the Sulphuretted Hydrogen with the Ammonia.

This process may be divided into two parts.

PART FIRST.

Materials.

1 Iron	= 28	1 Water	= 9
1 Sulphur	= 16	1 Sulphuric Acid	= 40
	—		—
1 Sulphuret of Iron	= 44	1 Liquid Sulphuric Acid	= 49

Products.

1 Iron	= 28	1 Hydrogen	= 1
1 Oxygen	= 8	1 Sulphur	= 16
1 Sulphuric Acid	= 40		—
	—	1 Sulphuretted Hydro-	
1 Sulphate of Iron	= 76	gen	= 17

PART SECOND.

Materials.

1 Sulphuretted Hydro-		1 Ammonia	= 17
gen	= 17	13 Water	= 117
			—
		1 Water of Ammo-	
		nia	= 134

Products.

1 Sulphuretted Hydrogen	= 17
1 Water of Ammonia	= 134
	—
1 Liquid Hydrosulphuret of Ammonia	= 151

In the Pharmacopœia of 1807, Muriatic Acid was directed; in this Pharmacopœia, Sulphuric Acid is sub-

stituted, being less costly than Muriatic Acid, and equally efficacious for the production of Sulphuretted Hydrogen.

PROPERTIES, AND TESTS OF ITS PURITY.—It should have a deep orange colour, and an extremely fœtid smell; and should yield a coloured precipitate with neutral metallic solutions, and when mixed with Nitrous Acid, an effervescence, from escape of Sulphuretted Hydrogen, with abundant deposition of Sulphur, should take place. Some years ago the writer ascertained, that if not saturated with Sulphuretted Hydrogen, it renders turbid the neutral Salts of Magnesia, which property it loses on approaching to complete neutralization.

USES.—*Pharmaceutical.* As a test of the presence of metals in solution.

—*Medicinal.* When taken internally it is supposed to have the property of depriving the system of Oxygen, and with this view it was recommended by Dr. Rollo in the treatment of Diabetes, under the name of Hepatized Ammonia. It has some narcotic action when taken internally.

DOSE.—From five to ten grains *by measure*, three times in the day. This preparation is but little used, although its effects on the human system, when it is properly prepared, are very considerable. Trials are wanting to ascertain its efficacy in diseases caused by over excitement.

PREPARED SULPHURET OF ANTIMONY.

Take of Sulphuret of Antimony any requisite quantity. Reduce to powder, according to the mode directed in the preparation of Chalk, and let the most subtile particles be preserved for use.

REMARKS.—The object of this process is merely to obtain the Sulphuret in very minute division, and thus to render it more susceptible of the action of Acids or of heat.

PROPERTIES, AND TESTS OF ITS PURITY.—In the solid form, it should appear as a striated mass of a blueish black or leaden colour; very fusible before the flame of the blow pipe, becoming as liquid as water, and yielding the vapours of Sulphur and Oxide of Antimony, the latter being deposited on charcoal, in form of a subtile white powder around the melted globule. Dissolving in Muria-tic Acid, with effervescence from extrication of Sulphu-retted Hydrogen; and on being passed into water, afford-ing a copious deposit of Oxide of Antimony.

It is composed of

1 Antimony	= 44
1 Sulphur	= 16
	—
1 Sulphuret of Antimony	= 44

USES.—*Pharmaceutical.* In the preparation of brown Antimoniated Sulphur; Antimonial powder; Nitromu-riatic Oxide of Antimony.

—*Medicinal.* Little used as an internal remedy. It is an inert preparation, unless when an acid is present in the primæ viæ. It acts as a diaphoretic, and some-times causes nausea and vomiting. It has been given in Gout, Rheumatism, and some cutaneous diseases.

DOSE.—From ten grains to two drachms.

SULPHURET OF IRON.

Let a rod of Iron be exposed to the strongest heat of a forge until it becomes white hot, and when taken from the fire let it instantly be applied to a solid mass of Sulphur. Let the Sulphuret of Iron be received in water, and, when separated from the Sulphur and dried, let it be preserved in closed vessels.

REMARKS.—Sulphur and Iron are by this process made to combine and form Protosulphuret of Iron. For this purpose the Iron must be brought to a *white* heat, for, at an inferior temperature, the union will not take place with rapidity. When a roll of cane brimstone is made to touch the iron at a white heat, an increase of temperature seems to take place, some of the iron or of the Sulphuret is volatilized in sparks, which are thrown out on every side; the sulphur is absorbed by the iron, and forming a liquid compound, drops into the water placed below. It is a perfect Protosulphuret of Iron. The water serves the purpose of extinguishing the drops of melted Sulphur, which by burning and producing Sulphureous fumes would inconvenience the operator. It is composed of

1 Iron	= 28
1 Sulphur	= 16
	—
1 Protosulphuret of Iron	= 44

PROPERTIES, AND TESTS OF ITS PURITY.—It is of a bronze yellow colour, of great weight and hardness. Pulverized and mixed with either diluted Sulphuric or

Muriatic Acid, it strongly effervesces, evolving Sulphuretted Hydrogen Gas, and the solution in either of these acids, when examined with appropriate tests, manifests the presence of Oxide of Iron.

USES.—*Pharmaceutical.* In the preparation of Water of Hydrosulphuret of Ammonia. It is also sometimes used in preparing Sulphuretted Hydrogen Gas, for the purpose of imitating the natural Sulphureous Waters.

BLACK SULPHURET OF MERCURY.

Take of Purified Mercury,
Sublimed Sulphur, of each one part,

Rub them together in a stone-ware mortar until the globules shall have disappeared.

REMARKS.—Mercury and Sulphur unite at the ordinary atmospheric temperature, when placed in contact and compressed; forming a black compound. It was formerly named Ethiops Mineral. The black Sulphuret or perfect Protosulphuret of Mercury is composed of

1 Sulphur	= 16
1 Mercury	= 200
	—
1 Protosulphuret of Mercury	= 216

This compound is formed by melting the Sulphur, and in this state mixing the Mercury with it; but experience shows that when it is so prepared it cannot be safely used as an internal remedy; for the Sulphur is apt to take fire and become acidified, and by this change some Sul-

phate of Mercury is produced and remains mixed with the product: accordingly it is found, that when the Sulphuret, prepared by fusion of the Sulphur, is given internally, it sometimes produces the violent effects attendant on the use of the Salts of Mercury containing Sulphuric Acid. For this reason the preparation, as directed in the older Pharmacopœias, sanctioned by long experience as a safe remedy, is here retained. It is obviously not a perfect chemical compound, as it contains a large excess of Sulphur.

PROPERTIES, AND TESTS OF ITS PURITY.—It should have a perfectly black colour. No globules of mercury should be discoverable in the powder when examined with a magnifying glass; nor should it, when rubbed on a piece of gold, impart a white tinge to that metal. Exposed to heat it should evaporate without leaving any residue. It is said to be sometimes adulterated with Sulphuret of Antimony; to this fraud there is little temptation, but should Sulphuret of Antimony be present, it may be detected by pouring strong Muriatic Acid on the mixture, and applying heat; Sulphuretted Hydrogen Gas will then be given out, and the filtered liquor mixed with water will deposit Oxide of Antimony.

USES.—*Medicinal.* It is a very inert preparation, being quite insoluble in water; the action which acids in the primæ viæ might exert on the mercury, which however can be but little, being prevented by its union with the sulphur. It is sometimes given as an alterative to children, in cases of scrofulous swellings, and in some cutaneous diseases.

RED SULPHURET OF MERCURY.

Take of Purified Mercury, nineteen parts,
Sublimed Sulphur, three parts.

Mix the mercury with the melted sulphur, and if the mixture takes fire extinguish the flame by covering the vessel.

Reduce to powder the product of this operation, and sublime it.

REMARKS.—By this process we form the Bisulphuret of Mercury; uniting the mercury with a quantity of sulphur double of that requisite to form the Black Sulphuret; the compound is known in commerce by the name of Cinnabar or Vermillion. To produce an intimate union of the sulphur and mercury, the sulphur should be made liquid by fusion, and the mercury minutely divided, by straining it through a linen cloth or through leather, and causing it thus to fall in form of a shower into the melted sulphur. On continuing the heat, part of the sulphur is volatilized, leaving an excess of mercury, which rises at the commencement of the process. When the temperature is increased, the union of the sulphur and mercury takes place suddenly, and with a slight explosion; and at this time the temperature rises still further, for the sulphur takes fire, and would continue to burn if it were not extinguished by covering the vessel and excluding the air. By increase of the heat the red sulphuret of Mercury will rise in vapour and attach itself to the colder part of the vessel; but a very considerable heat, approaching to a red heat, is required for this purpose, and the sulphuret will not rise much beyond that part of the vessel which is surrounded by the

fuel; for this reason in the manufacture of cinnabar on the large scale, the arrangement is such that the head into which the cinnabar is to be sublimed is quite contiguous to the body of the apparatus, which is made low or flat.

In repeating this process it was observed that with the Bisulphuret of Mercury a small quantity of a white substance had risen. This appeared nearly insoluble in water: it became black with Water of Caustic Potash or Water of Ammonia, and the alkaline liquor boiled on it during a short time, contained Sulphuric Acid. This sublimate was therefore Sulphate of Mercury. Its production is probably caused by the combustion of the Sulphur.

The proportion which the sulphur bore to the mercury was, in the Pharmacopœia of 1807, greater than in the process here directed; the sulphur in the former process amounting in quantity to 1-5th, in the latter to 1-6th of the mercury. The latter proportion corresponds more nearly than the former with the atomic quantities, for the Bisulphuret of Mercury is composed of

1 Mercury	= 200
2 Sulphur	= 32
—	
1 Bisulphuret of Mercury	= 232

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour should be cochineal red. Specific gravity exceeding 6, compared with water taken as unity. It should have a crystalline structure. Exposed to heat it should evaporate without leaving any residue. Mixed with clean iron filings and distilled, it should afford running mercury. In water and most acids it is insoluble.

USES.—*Medicinal.* As an alterative in glandular diseases. It is sometimes used for the purpose of mercurial

fumigation, when it is desirable to produce rapid salivation: great debility sometimes follows the effect so produced.

DOSE.—From ten grains to a scruple. Taken internally, it is a medicine of little activity.

SULPHURET OF POTASH.

Take of Carbonate of Potash, four parts,
Sublimed Sulphur, one part.

Let them, previously mixed, and passed into a crucible, with a cover fitted on, be exposed to a heat gradually increased until they completely unite. Let the Sulphuret be preserved in a well closed vessel.

REMARKS.—The process here given is a considerable improvement; as in all the Pharmacopœias of these countries the sulphur was directed in a proportion much too great. The quantities, as prescribed by the different Colleges, are here given.

PHARMACOPŒIA.	SULPHUR.	CARBONATE OF POTASH.
London	1	2
Edinburgh . . .	1	2
Dublin, 1807. . .	1	1
Dublin, 1826. . .	1	4

There are reasons for believing that the compound named Sulphuret of Potash, is a Sulphuret of Potassium; for, Berzelius found that if dry Sulphate of Potash be brought to a red heat in a tube, and Hydrogen Gas passed over it, the Sulphate is changed into a Sulphuret; water being formed in quantity equal to that which would result from the sum of the quantities of Oxygen contained in the Sulphuric Acid and Potash respectively, united to the proper quantity of Hydrogen. Potassium is also supposed to form with Sulphur a Bisulphuret, or a compound containing two atoms of Sulphur, and this becomes probable from the existence of two combinations of Sulphuric Acid with Potash, one containing twice as much acid as the other: but the latter opinion seems to rest more on theory than experience. The composition of the Sulphuret of Potassium is as follows:

1 Potassium	=	40
1 Sulphur	=	16
		—
1 Sulphuret of Potassium	=	56

This compound is formed by sixteen parts of Sulphur united to 70 parts of dry Carbonate of Potash. Whatsoever theory we adopt respecting the composition of this compound, the mode of preparing it as given in the present Pharmacopœia, is much to be preferred to that of the Pharmacopœia of 1807; the preparation being of a much darker colour, and according to the writer's experience, more soluble in water than that hitherto directed.

PROPERTIES, AND TESTS OF ITS PURITY.—It should have a dark brown colour, and dissolve completely in water, giving a solution of a deep orange colour, which on addition of Sulphuric, Muriatic, or Nitric Acid, should afford a deposition of Sulphur, and precipitate various metallic solutions, for example, those of Lead, Iron, or Mercury, of a black colour; and should give no deposit on adding to it a solution of Carbonate of Potash. From long exposure to air it becomes white on the surface by formation of Sulphate of Potash, and in the course of time the whole of the compound is thus changed.

USES.—*Medicinal.* Dissolved in the water of a tepid bath, it is found useful in some eruptive diseases, particularly Scabies and its varieties. It is used with advantage as an external application in Tinea Capitis.

WATER OF SULPHURET OF POTASH.

Take of Washed Sulphur, one part,

Water of Caustic Potash, eleven parts.

Boil during ten minutes, and filter through paper. Let the liquor be kept in well closed vessels. The specific gravity of this liquor is 1117.

REMARKS.—The preparation here directed is similar to that formed by dissolving Sulphuret of Potash in water. It was found on trial by the writer, that eleven parts of the water of Caustic Potash, of the strength given in this Pharmacopœia, dissolve one part of Sulphur.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour should be a deep orange. It should have an unctuous feel, and permanently stain the skin of an orange colour. With acids it should effervesce, affording Sulphuretted Hydrogen Gas, and acquiring a milky colour from deposition of sulphur; and it should have the specific gravity above assigned to it. The base being neutralized by Tartaric Acid and the liquor filtered, a further addition of Tartaric Acid should cause the deposition of Bitartrate of Potash.

USES.—*Medicinal.* It is often given internally in certain eruptive diseases, as in Scabies and Tinea Capitis.

DOSE.—From ten grains to a drachm *by measure*, sufficiently diluted with water, repeated three times in the day.

BROWN ANTIMONIATED SULPHUR.

Take of Prepared Sulphuret of Antimony, one part,
Water of Caustic Potash, eighteen parts,
Diluted Sulphuric Acid, eleven parts, or as
much as may be sufficient.

Add the Sulphuret of Antimony to the Water of Caustic Potash, and boil during an hour. Filter the hot liquor through a doubled linen cloth, and drop into it the diluted Sulphuric Acid. Wash off the Sulphate of Potash with warm water. Dry the brown Antimoniated Sulphur, and triturate it into a fine powder.

REMARKS.—Sulphuret of Antimony, which is composed of one atom of Antimony united to one atom of Sulphur, is acted upon and dissolved by the aqueous solution of Potash. From appearances we may infer it to be a compound of Protoxide of Antimony, united to Sulphur and Sulphuretted Hydrogen. The changes which take place from the action of the Alkali on the Sulphuret of Antimony, are theoretically represented in the following scheme :

Materials.

1 Antimony = 44	1 Potash = 48	1 Sulphuric
1 Sulphur = 16	58 Water = 522	Acid = 49
—	—	
1 Sulphuret of	Liquid	
Antimony = 60	Potash = 570	

Products.

1 Antimony = 44	1 Potash = 48
1 Oxygen = 8	1 Sulphuric Acid = 40
1 Sulphur = 16	58 Water = 522
1 Hydrogen = 1	—
—	1 Liquid Sulphate
1 Hydrosulphuret Ox-	of Potash = 610
ide of Antimony = 69	

Conformably with the theoretical view here given, it has been showed by Dr. John Davy, that when Kermes Mineral, the product of this operation, is exposed to heat, it is converted into Sulphuret of Antimony. According to the experiments of Büchner, the brown powder which subsides from the solution of Sulphuret of Antimony, in water of Caustic Potash; and which has been named Kermes mineral, is a compound of one atom of the Protoxide of Antimony, two atoms of the Sulphuret of An-

timony, and one atom of water.—See Supplement to the Edinburgh New Dispensatory, by Andrew Duncan, M. D., &c. p. 126.

PROPERTIES, AND TESTS OF ITS PURITY.—It should readily dissolve in aqueous solutions of the caustic fixed alkalies, from which, exhibiting its proper colour, it should be detached by an acid.

USES.—*Pharmaceutical.* It forms a part of the Compound Pill of Calomel.

—*Medicinal.* It contains the Oxide of Antimony, as it would appear, in a very soluble form, although it is with difficulty dissolved in Diluted Muriatic Acid. It is not often prescribed as a remedy in this country, though in frequent use on the continent, where it is deemed an active preparation.

DOSE.—From one to four grains, twice in the day.

WASHED SULPHUR.

Let hot water be poured on Sublimed Sulphur, and let the washing be repeated so long as the effused water appears contaminated with acid. This is discoverable by means of Litmus. Let the Sulphur be dried on bibulous paper.

REMARKS.—The object of this process is to free the sulphur from any adhering acid, with which it is frequently contaminated in the process by which it is obtained. By means of an infusion of Litmus, or of paper tinged with the colouring matter of that very delicate test of an acid, a very minute quantity of adhering Sulphuric or Sulphurous Acid may be detected.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is yellow. Its specific gravity 1.99. It is a nonconductor of electricity, and when rubbed acquires negative electricity. It is tasteless and insoluble in water. Exposed to temperature 216° it fuses: at 550° it is sublimed, and at 300° in air, it takes fire, burning with a bluish coloured flame, and producing Sulphureous Acid Gas, recognizable by its suffocating smell, its property of destroying certain vegetable colours, and of forming peculiar salts with the different bases. Sulphur readily unites with Iron, Copper, Zinc and Mercury, and is dissolved by aqueous solutions of the caustic fixed Alkalies and Alkaline Earths, forming liquid compounds of an orange colour; from these it is thrown down of a white colour in form of a hydrate by addition of acids. Sulphur is also dissolved by hot Oil of Turpentine, from which, on reduction of the temperature, it is deposited in crystals. When made to burn with sufficient access of air, it should pass off without leaving any residue.

USES.—*Pharmaceutical*. Sulphur is used either in rolls under the name of Cane Brimstone, or in fine powder as above directed. In form of rolls it is employed to prepare the Sulphuret of Iron; in the pulverulent form of Sublimed Sulphur washed as above directed, sulphur is applied to prepare the black and red Sulphurets of Mercury, Sulphuret of Potash and Sulphur Ointment.

—*Medicinal*. As an internal remedy, it is but little used. It operates as a laxative, and from the mildness and permanency of its action is frequently given in hæmorrhoids, and generally conjoined with Bitartrate of Potash or Carbonate of Magnesia. That it is taken up by the absorbents and carried into the system, appears from the change of colour observed to take place in silver kept near to the surface of those persons who have used sulphur as an internal remedy. It must, however, be allowed that the same change takes place in silver when

it is worn near to the bodies of those who are not using sulphur, provided that the metal is not exposed to friction; because animal effluvia contain sulphur, and gradually change the colour of silver, by producing a Sulphuret of that metal. It exerts some action in the cure of scabies when taken internally; and it is a most effectual remedy for that disease, when applied externally, in form of Sulphur Ointment.

Dose.—From one to three drachms.

SECTION VII.

METALLIC PREPARATIONS.

ANTIMONIAL POWDER.

Take of Sulphuret of Antimony, one part,
Shavings of Hartshorn, two parts.

Mix, and pass into a wide iron pot heated to redness, continually stirring until the vapours of the sulphur cease to be disengaged, and the mixture shall have become ash-coloured. Reduce the materials to powder, and pass them into a crucible. To this let another inverted crucible be fitted, having a small aperture in the bottom. The temperature being gradually raised, let the materials be exposed to a white heat, continued during two hours. Lastly, when cooled, let them be reduced to a most subtile powder.

REMARKS.—This has been considered as similar in composition to the celebrated preparation sold under the name of James's Powder. It was first prepared according to the specification of Dr. James's patent, by roasting the Sulphuret of Antimony, then mixing the Sulphuretted Oxide so procured, with an equal weight of Nitre, heating the mixture to redness during an hour, and when cold, washing it with water. But Dr. James either changed his process or gave a disguised description of it; for the powder was examined by the late Dr. Pearson of London, and found to consist merely of Antimony, in different states of combination with Oxygen; and of the Phosphate of Lime.

On application of heat to the materials above prescribed, the mixture emits fumes, the sulphur is expelled from the Sulphuret of Antimony, and the antimony by uniting with the oxygen of the atmosphere, is changed either into an oxide or an acid. The animal part of the hartshorn shavings is at the same time decomposed and burnt off, and by continuance of a strong heat the mixture acquires a pure white colour, the sides of the crucible being covered with a yellow glaze. According to Dr. Pearson's experiments, the loss of weight on the materials varies from 37 to 41 per cent.

The Pharmacopœias of London and Dublin prescribe two parts of the Shavings of Hartshorn for one part of Sulphuret of Antimony; but those of Edinburgh and Paris, equal parts of the ingredients.

According to the process of the Dublin Pharmacopœia of 1807, the hartshorn shavings were first boiled, in order to detach the animal matter from the Phosphate of Lime. This part of the direction is here omitted, as it is supposed that the animal matter in the bones prevents vitrification; and the process of the London Pharmacopœia is adopted.

Antimony is now generally considered as forming three distinct combinations with Oxygen, compounded as follows :

FIRST.

1 Antimony	=	44
1 Oxygen	=	8
		—
1 Oxide of Antimony	=	52

SECOND.

2 Antimony	=	88	1 Antimony	=	44
3 Oxygen	=	24	or 1½ Oxygen	=	12
		—			—
1 Antimonious Acid	=	112	1 Antimonious Acid	=	56

THIRD.

1 Antimony	=	44
2 Oxygen	=	16
		—
1 Antimonic Acid	=	60

The first, as might be inferred from its name, unites to acids ; the two last unite to acids with difficulty, but more readily to alkalies. Of these, the Oxide is much the most active, when taken internally ; the Acids of Antimony, more especially that which contains the larger quantity of Oxygen, being comparatively inert. By exposure to heat, the Antimony is converted into Oxide of Antimony and into Antimonious or Antimonic Acid. The analysis of Dr. Pearson showed that James's Powder in 100 parts contained 57 of Oxide of Antimony, and of these, about 34 parts were insoluble in acids, or had the properties of Antimonious or Antimonic Acids. His analysis gave the following results :

Phosphate of Lime	41.66
Oxide of Antimony	23.81
Insoluble Oxide of Antimony and Phosphate of Lime	31.18
Loss.. ..	3.33
<hr/>	
Total	99.98

An analysis of *Pulvis Antimonialis* made some years after by Mr. Chenevix, assigns to the Acids of Antimony a somewhat greater proportion, or about 44 per cent.; and Mr. Philips found from 35 to 38 per cent. of Peroxide of Antimony; the compound here termed Antimonious and Antimonic Acids. An analysis of James's Powder made by M. Pully, and detailed in the *Annales de Chimie*, T. 55, p. 74, assigns a somewhat different composition to this powder.

Peroxide or Acids of Antimony ..	36.842
Phosphate of Lime ..	21.052
Sulphate of Potash ..	23.689
Free Potash united to Oxide of Antimony ..	18.421
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Total	100.004

It seems probable that the specimens here reported to have been examined, were prepared according to the specification of Dr. James's patent, by roasting the materials, but omitting to wash the product. Some specimens of genuine James's Powder which I examined, contained scarcely any trace of adhering sulphate. M. Pully proposes to recompound James's powder by mixing the following pulverized substances, and exposing them to heat:

	Parts.
Sulphuret of Antimony	2
Calcined Phosphate of Lime	1½
Nitre	4

As antimony unites with different quantities of oxygen, and as these compounds are more or less volatile when exposed to a high temperature, the composition of both James's Powder and Pulvis Antimonialis must vary; and from the same causes, these preparations produce variable effects on the human system, as their efficacy depends, as well on the quantity of the antimonial constituent as on the state of this latter with respect to its oxydation; the Oxide of Antimony being an active preparation, but the Acids of Antimony comparatively inert. An opinion has been entertained, that a triple salt was formed by the Phosphoric Acid with the Oxide of Antimony and the Lime; but the easy separation of the Phosphate of Lime from the other constituents, by the action of an acid and water, appears adverse to this supposition.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is dull white. It is tasteless and insoluble in water. In Muriatic Acid it partially dissolves, and the solution dropped into pure water becomes turbid, and with water containing Sulphuretted Hydrogen it affords an orange coloured deposit. The solution, which has been made turbid by addition of much water, when filtered and mixed with Water of Ammonia, deposits Phosphate of Lime in abundance. The activity of the preparation, when taken as a medicine, will be in proportion to the turbidness caused by dropping its muriatic solution into water.

USES.—*Medicinal.* This powder has been much used as a diaphoretic, particularly in febrile diseases. More

efficacy than it is entitled to claim has been attributed to it. Its activity as a medicine, depends on the quantity of soluble Oxide of Antimony it contains, which, from the causes mentioned, is variable. The state of the alimentary canal, with respect to acidity, must also modify its operation. From the separate or concurrent existence of these causes, it often proves very inert, and is frequently given in very large doses without producing any sensible effect, although it often causes perspiration, nausea, vomiting and purging. It is sometimes given in rheumatic complaints combined with Guaiacum, and has been useful in the treatment of dropsy of the brain when given in conjunction with calomel.

DOSE.—From three to ten grains repeated three times in the day: much larger quantities have been given without producing any operation on the stomach or bowels. Dr. Elliotson relates cases in which he gave from half a drachm to a drachm with little or no effect.—See *Med. Chirurg. Transactions*, v. 13, p. 233. The experience of most practising physicians leads to a similar conclusion.

NITRO MURIATIC OXIDE OF ANTIMONY.

Take of prepared Sulphuret of Antimony twenty parts,
Muriatic Acid one hundred parts,
Nitric Acid one part.

Gradually add the sulphuret to the acids, previously mixed in a glass vessel, avoiding the vapours; then with a heat gradually increased, digest, until the mixture ceases to effervesce, then boil during an hour. Receive

which it contributes to compose, we owe to Dr. Perceval. The changes resulting from the action of the Muriatic Acid on the Sulphuret of Antimony may be thus represented:

Materials.

1 Antimony	= 44	1 Muriatic Acid	= 37
1 Sulphur	= 16	1 Oxygen	= 8
	—	1 Hydrogen	= 1
1 Sulphuret of Anti-			—
mony	= 60	1 Liquid Muriatic	
		Acid	= 46

Products.

1 Antimony	= 44	1 Sulphur	= 16
1 Oxygen	= 8	1 Hydrogen	= 1
1 Muriatic Acid	= 37		—
	—	1 Sulphuretted Hy-	
1 Muriate of Anti-		drogen	= 17
mony	= 89		

The Nitric Acid is here omitted as it acts on an indefinite quantity of materials, namely, the Sulphuretted Hydrogen diffused through the water of the liquid Muriate of Antimony.

When the solution is passed into water; of which the quantity should be very large in proportion to the Muriate; a white powder subsides in great abundance; this is the Oxide of Antimony in combination with some Muriatic Acid, which can be detached from the oxide by sufficient washing either with pure water or with this fluid containing a small portion of alkali. When the quantity of water employed in washing the precipitated oxide is not sufficiently large, the precipitate is sometimes observed to form numerous crystals within the filter; and this has happened when the Muriatic Oxide appeared on the

filter, a pulpy and almost solid mass ; showing, that perfect fluidity is not an essential requisite in the process of crystallization. The Muriatic Oxide of Antimony which falls down on passing the solution into water, was formerly named Powder of Algaroth, from Algarotti, an Italian physician, who recommended its use in medicine.

A preparation, similar to the Muriatic solution here given, but containing little or no water, was formerly in use as a caustic, under the name of Butter of Antimony, to which purpose it is sometimes applied by surgeons of the present day. This was prepared by different methods. By subjecting to distillation, a mixture of two parts of pulverized Corrosive Sublimate with one of Antimony, or by a similar process, with a mixture of Sulphuret of Antimony ; sometimes partially decomposed by roasting ; together with Muriate of Soda and Sulphuric Acid ; in which case, a dense fluid was obtained, passing into white scales having a silky lustre ; these are permanent in the air, and are composed, according to the experiments of Dr. J. Davy, of

1 Chlorine	=	36
2 Antimony	=	88
<hr/>		
*2 Dichloride of Antimony	=	124

If the fluid first obtained be concentrated by heat, till liquid no longer passes into the receiver, it forms a solid mass, or sometimes octahedral crystals, which are deliquescent on exposure to air, and are composed of

1 Chlorine	=	36
1 Antimony	=	44
<hr/>		
1 Chloride of Antimony	=	80

* The nomenclature of Dr. Thomson is here adopted, expressing the predominance of the base in the number of its atoms.

See Dr. Thomson's First Principles of Chemistry, v. 2. p. 46. This compound, under the name of Butter of Antimony, was formerly used in preparing the Oxide of Antimony or Powder of Algaroth.

PROPERTIES, AND TESTS OF ITS PURITY.—The colour of the Nitromuriatic Oxide of Antimony should be white. Exposed to heat it should melt, and on increase of the heat with access of air, it should rise in white vapours, condensing on contiguous substances of a lower temperature. Four parts of it well mixed with five parts of pulverized Bitartrate of Potash, passed into about thirty-four parts of water, and exposed to a boiling heat, should afford a solution depositing crystals on cooling, and on addition of a hydrosulphuret letting fall a copious orange coloured powder. The crystals should appear soluble in from twelve to thirteen times their weight of water at the temperature of 60°.

USES.—*Pharmaceutical.* In the preparation of Emetic Tartar only.

—*Medicinal.* In its detached form it is not used as a medicine. Formerly it was so employed, but was found very uncertain in its operation; this might arise from different causes; the adhesion of Muriatic Acid to the Oxide, by which its activity would be much increased, or the state of the patient's stomach as to the existence of an acid or of disposition to acidity. When the Oxide of Antimony is prepared from a solution of Emetic Tartar, decomposed by means of Liquid Carbonate of Ammonia; in which case no Muriatic Acid can be supposed to adhere to the Oxide; it is said still to possess much activity.

DOSE.—From one to ten grains.

TARTRATE OF ANTIMONY AND POTASH OR
EMETIC TARTAR.

Take of Nitromuriatic Oxide of Antimony four parts,
Bitartrate of Potash, triturated to a most sub-
tile powder, five parts,
Distilled Water, thirty-four parts.

Heat being applied, let the water boil in a glass vessel; then gradually pass into the water, the Oxide and Bitartrate of Potash previously mixed, and boil during half an hour; then filter the liquor through paper, and let it cool slowly, that crystals may be formed.

REMARKS.—In this process the excess of Tartaric Acid contained in the Bitartrate of Potash, becomes united to the Oxide of Antimony and a triple salt, the Tartrate of Antimony and Potash is formed. In this case either the Bitartrate acts the part of an acid, and unites to the Oxide of Antimony; or a combination is formed of Tartrate of Potash and Tartrate of Antimony. It appears adverse to the latter view, that Tartaric Acid does not unite with Oxide of Antimony and form a perfect and crystallized salt; the Bitartrate of Potash would therefore seem, according to the opinion of M. G. Lussac, to perform the part of an acid.

Of the three different definite compounds formed by Antimony and Oxygen, the Oxide alone is fit for the production of Emetic Tartar and for the formation of a perfect salt. Various Oxides of Antimony were used for this purpose, even by the different Colleges. The London College directed an Oxide prepared by mixing Pulverized Sulphuret of Antimony and Nitre with Sulphuric

Acid, and applying heat to the mixture; the Antimony becomes an Oxide, the sulphur is changed into Sulphuric and Sulphurous Acids, which remain in combination with the Potash of the Nitre, and are also united in small quantity with the Oxide of Antimony. All the soluble parts consisting of the Sulphuric and Sulphurous Acids with Potash, are by washing detached from the Oxide of Antimony. According to the Edinburgh process, a Sulphuretted Oxide is obtained by deflagrating in a red hot crucible equal weights of Sulphuret of Antimony and Nitre, and washing the residue with water, until all adhering matter has been abstracted. According to the process of the Pharmacopœia Gallica, the Glass of Antimony is employed; which is prepared by roasting the Sulphuret of Antimony, and exposing the product to a heat sufficient to cause it to run into glass. It becomes a transparent mass, of a hyacinth colour. It is a vitrified Oxide of Antimony united to some Sulphur. It always contains some Silica, in quantity of from 9 to 12 per cent., according to the experiments of Vauquelin. It is also sometimes contaminated by Glass of Lead. This Antimonial Oxide is now adopted by the London College. Lastly, that prepared by the process of the Dublin Pharmacopœia, above given. Any Oxide of Antimony may be used for preparing Emetic Tartar; but Metallic Antimony will not serve this purpose. Accordingly the formation of Emetic Tartar by a compound containing Antimony, may be in general considered as a proof of the existence of the antimony in form of an oxide. Thus Emetic Tartar can be produced by those Sulphuretted Oxides known by the name of Kermes Mineral and Golden Sulphur of Antimony, but cannot be formed by the Grey Sulphuret of Antimony itself. Among the different modes hitherto used to form the salt, that prescribed in this Pharmacopœia, with Oxide of Antimony, first proposed by Bergman, seems most likely to afford Emetic Tartar uniform in its composition and of great

purity. It has also this advantage over most of the other processes, that it is all performed in the humid way, and being under the control of the operator, is more likely to give an uniform result than when the igneous process is adopted. With respect to the Bitartrate of Potash, it should be pure and as white as possible. It is met in commerce, generally of sufficient purity. Its pulverization and admixture with the Oxide of Antimony, facilitates the solution and combination of these ingredients. The just proportion of the Oxide of Antimony to the Bitartrate of Potash was determined by Dr. Perceval, and his adjustment is found to be correct; experiment showing that when the ingredients are mixed in the proportion of four parts of Oxide of Antimony to five of Bitartrate of Potash, with the water as directed, and heat applied so as to cause the water to boil, that a small excess only of Oxide of Antimony remains undissolved. This arrangement of the proportions of Oxide and Bitartrate, is that which should be desired, as an excess of Bitartrate of Potash is more injurious than of Antimonial Oxide. There is reason to suspect that Bitartrate of Potash is often superabundant in the Emetic Tartar of Commerce, either in consequence of the use of an oxide unfit for the preparation; from its containing much Antimonious or Antimonic Acid; or from an excess of Bitartrate of Potash, and the disregard of that very necessary part of the direction, that the Emetic Tartar should be obtained in *crystals* from the liquor. When the quantity of water in proportion to the materials, is equivalent to that directed in the Pharmacopœia, the liquor acquires a wine yellow colour, and on cooling deposits crystals of Emetic Tartar; the quantity of these crystals will of course vary according to different circumstances; chiefly the refrigeration of the liquor and the length of time this has been allowed to remain. Four parts of Oxide of Antimony with five of Bitartrate of Potash,

the quantities directed in the Pharmacopœia, and the proportional quantity of water there prescribed, yielded to the writer a quantity of Emetic Tartar amounting to nearly five parts, or equal to the Bitartrate employed.

The atomic quantities, and their transfer, are here represented:

Materials.

1 Potash	=	48	3 Oxide of Anti-	
2 Tartaric Acid	=	132	mony	= 156
2 Water	=	18		
<hr/>				
1 Bitartrate of Pot-				
ash, crystallized	=	198		

Products.

1 Potash	=	48
2 Tartaric Acid	=	132
3 Oxide of Antimony	=	156
2 Water	=	18
<hr/>		
1 Emetic Tartar	=	354

It is evident from this statement, compared with the result of experiment, that a large quantity of Emetic Tartar remains dissolved in the water, and that a larger product might be obtained, either by the use of less water than that directed in the Pharmacopœia, or by diminishing this by evaporation: Vauquelin recommends that the salt should be evaporated to dryness, then redissolved and crystallized; this he states to be necessary for the separation of Silica contained in the Glass of Antimony; and it may be required for the production of Emetic

Tartar according to the process of the Pharmacopœia Gallica, but is unnecessary when the salt is prepared by the modes practised in these countries.

The quantities of the ingredients, as directed by the different Colleges, are as follows :

COLLEGES.	Oxide of Antimony.	Bitartrate of Potash.	Water.
	Parts.		
LONDON ..	4	4	24
EDINBURGH ..	4	4	16
DUBLIN ...	4	5	34
PARIS ..	4	6	indefinite.

In the Parisian Codex Medicamentarius, the Glass of Antimony is used, and the mixture is directed to be evaporated until it shall have arrived at specific gravity 1161, at which density we are to understand that crystals will be formed by cooling. If an excess of Oxide of Antimony remains after the action of boiling water on the ingredients of this preparation, still greater must be the excess in the processes of the London and Edinburgh Colleges, but of the two latter the excess must be least after that of the Edinburgh College, as a Sulphuretted Oxide is employed.

PROPERTIES, AND TESTS OF ITS PURITY.—It should be white and crystallized in the form of an octahedron with a rhombic base. When prepared with the oxide obtained from Sulphuret of Antimony by Muriatic Acid alone, it crystallizes in the form of a tetrahedron, and the crystals are often of considerable size, an inch or more in diameter. By exposure to air it becomes somewhat

opaque, probably from its undergoing a slight degree of efflorescence. When heated, it emits vapours, becomes black, and yields Metallic Antimony, recognizable by its brittleness, foliated structure, fusibility by heat, and its affording, when heated in contact with air, a volatile and crystallized oxide. Emetic Tartar is stated to dissolve in fourteen or fifteen times its weight of water. Dr. Perceval informed me that he found good Emetic Tartar to dissolve in twelve times its weight of water, and that he always considered this as one of the best tests of its purity. The solubility will of course appear different according to the temperature to which the solution is cooled, as well as to the time of its exposure; and more of the salt will be held in solution at a certain low temperature, if the water has first been saturated at a high temperature, than will be taken up by the same quantity of the water if applied to the salt at the same low temperature. In an experiment I made some years ago, good Emetic Tartar dissolved by a boiling heat in distilled water, remained in solution in 9.4 times its weight of water at the temperature of 66°.

The solution of Emetic Tartar should afford an abundant orange coloured deposit with the Hydrosulphuret of Potash or of Ammonia. The crystals when exposed to heat should first become brown, and then black, from decomposition of the Tartaric Acid.

USES.—*Pharmaceutical*. It is the active ingredient in the liquor of Emetic Tartar and in the Ointment of Emetic Tartar.

—*Medicinal*. In a moderate dose it acts as a diaphoretic or sudorific; in larger dose as an emetic and sometimes as a purgative. The first effect is produced by this remedy, when given in doses below one-fourth of a grain; the second when the dose amounts to one, two, and three grains. It has latterly been given, particularly in Italy and France, in very large doses, amounting to from

thirty to sixty grains or more, dissolved in the merely sufficient quantity of water, restricting the patient from the use of all drink whilst under its operation. In these doses it is said to exert a sedative action, and to be a useful remedy in inflammatory cases. It is much to be wished that those who have given it in this manner, had stated the purity of the salt, determined by experiments similar to those above described as tests of its purity; for if the salt employed was impure or adulterated, serious consequences might arise from the same application of a pure salt. The effects seem to vary much, according to the constitution of the patient. Twenty grains, or a little more, in some instances acted as a poison, according to the testimony of Orfila. Dr. A. Duncan, of Edinburgh, has found it to act as a sedative and with good effect when given in doses of five grains where the powers of life were too feeble to admit of blood-letting. When taken in large quantity, and acting as a poison, it produces much vomiting and cramps in the stomach; Orfila recommends copious draughts of water sweetened with sugar; and if the pain should continue, a grain of opium repeated two or three times, at intervals of a quarter of an hour. It is decomposed by infusion or decoction of bark; and Orfila recommends this also as an antidote to its effects. Dr. Duncan tried with advantage a solution of Sulphuret of Potash for the same purpose. Thus it appears, that in very small doses not exceeding one-fourth part of a grain, it acts as a diaphoretic, in doses of from one to four grains as an emetic, and in doses not exceeding five grains, but in general much below this quantity, its action is sedative; but in these large doses it should be used with caution. To cause vomiting, the most effectual mode is to give it in half grain doses, repeated at intervals of ten minutes until vomiting is produced. As an emetic, it is frequently given with advantage at the commencement of febrile attacks; as a dia-

phoretic also, it is given, oftentimes beneficially in such cases: as a sedative, it is considered useful in cases of Pneumonia or Bronchitis. It is also sometimes used as an external application, and then it has the effect of producing a pustular eruption.

DOSE.—From one-tenth of a grain to half a grain, as a diaphoretic; from one to four grains, as an emetic; and in larger quantities, not exceeding eight grains, as a sedative.

LIQUOR OF EMETIC TARTAR.

Take of Tartrate of Antimony and Potash, one scruple,
Hot Distilled Water *by measure*, eight ounces,
Rectified Spirit of Wine *by measure*, two
ounces.

Dissolve the Tartrate of Antimony and Potash in the water, and to the filtered liquor add the Spirit.

REMARKS.—This is intended as a substitute for the antimonial wine of the older Pharmacopœias, which was prepared by digesting in White Wine the pulverized Glass of Antimony. The preparation must therefore have been very irregular as to the quantity of Oxide of Antimony, or of Emetic Tartar which it contained, as this must have depended on the quantity of Bitartrate of Potash present in the wine. To correct this irregularity, a form is prescribed, in which a solution of Emetic Tartar in distilled water is directed; and to prevent the decomposition which all tartrates undergo if long kept, rectified spirit is added in the proportion of one-fourth of the volume of the water. This prevents decomposi-

tion ; but the solution when long kept is apt to deposit crystals, their separation being promoted by the attraction of the spirit for the water. The solution of the salt must be first made in the water, and the spirit added ; as the salt has little solubility in the spirit.

USES.—*Medicinal.* It is a convenient form for exhibition of Emetic Tartar, particularly when it is to be given in small divided doses. Each ounce *measured* contains two grains of Emetic Tartar, and each drachm *measured*, a quarter of a grain.

DOSE.—As a diaphoretic, from a scruple to two drachms *measured*. As an emetic, two drachms *measured*, diluted with water and given at intervals of about ten minutes, repeated four or five times, or until the effect is produced.

CRYSTALS OF NITRATE OF SILVER.

Take of Silver laminated and cut into small fragments,
thirty-seven parts,
Diluted Nitric Acid, sixty parts.

Let the silver be passed into a glass vessel, and let the acid, previously diluted with water, be poured on it. Dissolve the metal with a heat gradually increased ; then by evaporation and refrigeration let crystals be formed, to be dried without heat and to be preserved in a glass vessel placed in darkness.

REMARKS.—When diluted Nitric Acid is poured on silver and heat applied, decomposition of the acid takes place, a part of its oxygen passing to the silver and converting it into Oxide of Silver, which is dissolved by the

remaining acid; the other constituent of the decomposed portion of acid, namely, the Nitric Oxide Gas, escaping with effervescence. If the silver is pure the solution will be colourless, if contaminated by copper, which is often the case, especially with the standard silver of commerce, the solution will have a bluish green tinge, deeper in proportion to the quantity of cupreous alloy; and this tinge cannot be made to disappear by heating the liquor, which would happen if the colour were produced by Nitric Oxide Gas; for this is known to impart various tinges of colour to Nitric Acid. A minute quantity of Gold is generally contained in the Silver of Commerce, and not being soluble in the Nitric Acid, the Gold remains in form of a deep purple coloured powder at the bottom of the vessel containing the solution of silver.

For this preparation pure silver should be used, which is most conveniently obtained by reducing, with the aid of heat, the Chloride of Silver mixed with Carbonate of Soda; by which process it is obtained free from all alloy. The Nitric Acid should also be pure. Of the impurities it may contain, Muriatic Acid is the most inconvenient, as it throws down the silver in the form of insoluble Muriate of Silver. In an experiment which I made to ascertain the quantity of silver taken up by a certain quantity of acid; 100 parts of Diluted Nitric Acid of specific gravity 1280, took up 61.45 of pure silver. Sixty parts of the same acid would therefore dissolve very nearly 37 of silver as $100 : 61.45 :: 60 : 36.8$.

The changes and atomic weights are thus represented :

Materials.

3 Silver	= 330	4 Nitrogen	} = 4 Nitric Acid	
		20 Oxygen		= 216
		39 Water		= 351
				<hr/>
Diluted Nitric Acid				= 567

Products.

3 Silver	}	= 3 Oxide	1 Nitric Oxide Gas	= 30
3 Oxygen		of Silver = 354	39 Water (disen-	
3 Nitric Acid		= 162	gaged).	= 351
<hr/>				
3 Nitrate of Silver		= 516	Total	= 381

Crystals form in the liquor when the solution is completed, and more crystals may be obtained by evaporation and cooling of the residual liquor. The crystals should be dried without heat on blotting paper. Their colour is changed by light in consequence of the reduction of the Oxide of Silver; for this reason the crystals should not only be dried in the shade, but also kept in a dark place. The process given in the formula of the Dublin College, has the advantage of greater facility than those directed by the London and Edinburgh Colleges, as the latter direct *strong* Nitric Acid, which for this process is to be diluted with water; thus increasing the operator's work, and exposing him to the fumes disengaged from the strong acid during its dilution with water.

PROPERTIES, AND TESTS OF ITS PURITY.—It is a white salt, generally appearing in thin scales or plates, but when made in large quantity it presents regular crystals of a rhomboidal form. The primitive form is a right rhombic prism. The salt undergoes little change from exposure to air. It dissolves in about its own weight of water, and in about four times its weight of alcohol, according to Dr. Thomson.—See his *First Principles of Chemistry*, v. 2. p. 405. Traces drawn with a dense solution of Nitrate of Silver on white paper, linen or cotton, soon become brown and afterwards black from exposure to solar light. Its solution in water is immediately decomposed by Muriatic Acid, either detached

or in combination with a base, and Muriate of Silver is thrown down, which, by drying, becomes Chloride of Silver. This precipitate on exposure to light at first assumes a pearl coloured tinge, and lastly a deep purple colour approaching to black; it readily dissolves in Water of Ammonia. From the solution of Nitrate of Silver a clean plate of copper throws down the silver in the metallic state. The taste of the Nitrate of Silver is very acrid; when its solution is concentrated or in the solid form it acts as a caustic, and when swallowed it is poisonous. Exposed to heat it fuses, and when in this state passed into cylindrical moulds it forms *Lunar Caustic*. Exposed to a strong heat the Nitric Acid of the salt is decomposed, the oxygen expelled, the silver appearing in its disengaged metallic form. The aqueous solution of the Nitrate of Silver should be free from colour, and should not acquire a blue tinge on adding to it Water of Ammonia, in quantity sufficient to redissolve the Oxide of Silver. The blue colour in this case indicates the presence of Oxide of Copper.

USES.—*Pharmaceutical*. In preparing the fused Nitrate of Silver or Lunar Caustic, and as a test of the presence of Muriatic Acid.

—*Medicinal*. It was formerly given in considerable doses as a remedy for dropsy, and it is now used as a remedy for epilepsy, in which disease it is sometimes beneficial, but it often completely fails. It has also been given in chorea and angina pectoris. When used as an internal remedy, the pure crystals should be employed. The medicine should never be given in the liquid form, but in that of a pill, and if this is formed with crumb of bread, this should, by washing it, be freed from sea salt, which would decompose the Nitrate of Silver. I have heard of inconvenience arising from the pill happening to stick in the patient's throat: this should be guarded against by covering the pill with silver leaf, and

by swallowing a fluid with the pill. Extract of gentian has been recommended, as a good vehicle for Nitrate of Silver in form of pill. It is principally found beneficial when it operates as a purgative.

An inconvenience attends its use when long continued, that the patient's skin acquires a dark leaden or almost black hue, and this takes place several months after the remedy has been discontinued; and the change of colour obstinately continues, sometimes for years. It has been observed most intense on the parts exposed to the light; and the face has acquired the colour of a negro or of a bronze bust, whilst the parts covered from the light have retained their natural hue. Sementini, an Italian Physician, asserts that this inconvenience may be obviated by making the patient avoid sunshine. However it has sometimes been observed that parts not exposed to light, as the inside of the mouth and tongue, were also discoloured.—See a case related by Dr. Badely, *Med. Chirurg. Trans.* v. 9, p. 238.

Its solution in water is used as an injection in fistulous sores, and as a lotion for the mouth in cases of apthæ and relaxation of the gums. The healing of sores is also promoted by touching them with its aqueous solution.

In large dose it acts as a poison. A diluted solution of sea salt, given before inflammatory action has commenced, is an obvious and effectual antidote. Orfila recommends that a large spoonful of sea salt should be dissolved in two pints of water, and several glasses of the salt water taken till vomiting is produced. Should inflammation have commenced, general and topical bleeding, with fomentation and glysters, should be had recourse to.

DOSE.—For internal use, from one-eighth of a grain to four grains, or more, three times in the day.

The Solution of Nitrate of Silver, for external use, may be prepared by dissolving two grains of the crystals in one ounce *measured* of distilled water.

FUSED NITRATE OF SILVER.

Let Silver be dissolved in Diluted Nitric Acid as above described; then let the liquor be evaporated to dryness. Let the remaining mass, passed into a crucible, be liquefied by a slow heat. Let it then be poured out into proper moulds, and preserved in a glass vessel.

REMARKS.—This preparation is commonly named Lunar Caustic or Lapis Infernalis. When dry Nitrate of Silver is exposed to heat it fuses, and by strong heat the Nitric Acid and Oxygen are expelled from the silver, which remains in its metallic form; consequently the heat applied to the silver in this process should not be more than is sufficient to fuse the salt; else some of it will be decomposed, and Metallic Silver mixed with the product. The dark colour of Nitrate of Silver sometimes arises from this cause. Exposure to light also contributes to give to the external surface of the cylinders of lunar caustic their deep purple or black hue. Dr. Thomson states, that he has often found copper and gold in common fused Nitrate of Silver: this must arise from the substitution of alloyed Silver of Commerce in place of the pure silver directed in the Pharmacopœia. This *pure* Silver is best obtained by exposing a mixture of two parts of dried Carbonate of Soda with one part of Chloride of Silver, in a crucible to a strong red heat: a button of pure silver is found in the bottom of the crucible.

The fusion of the dried Nitrate of Silver for the preparation of Lunar Caustic, is best performed in a silver crucible of a capacity much exceeding the materials, as these are apt to swell up from the extrication of gaseous matter. The moulds into which the fluid nitrate is to be poured should be warm.

PROPERTIES, AND TESTS OF ITS PURITY.—It should dissolve completely in distilled water, the portion which remains undissolved being inert, and unfit for the purpose of a caustic. Its solution should have the properties above described as belonging to pure Nitrate of Silver.

USES.—*Medicinal.* It is principally employed as a caustic, and to this purpose it is well adapted, for, not being deliquescent, it does not spread beyond the part to which it is applied; an inconvenience attendant on the use of Caustic Potash.

On its application to the skin, this first becomes yellow, and changes to a dark purple or black colour, and comes off. It is used in ulceration of the tarsi palpebrarum and to fungous excrescences with advantage. It has also been used in stricture of the urethra. It is not given internally; the crystals should always be preferred.

USES.—*General.* When dissolved in water, holding diffused through it a little sap green, it forms the basis of the indelible ink used for marking linen and calico. The ink is prevented from running on the cloth, by soaking in a strong solution of Carbonate of Soda and then drying, the part on which the traces are to be made. For the latter purpose a strong solution of soap in water, similarly applied, will serve the purpose nearly as well.

SUBLIMED WHITE OXIDE OF ARSENIC.

Let the Oxide of Arsenic, reduced to a coarse powder, be exposed to heat in a suitable vessel, avoiding the vapours, that the White Oxide of Arsenic may be sublimed.

FUSED NITRATE OF SILVER.

Let Silver be dissolved in Diluted Nitric Acid as above described; then let the liquor be evaporated to dryness. Let the remaining mass, passed into a crucible, be liquefied by a slow heat. Let it then be poured out into proper moulds, and preserved in a glass vessel.

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SUBLIMED WHITE OXIDE OF ARSENIC.

Let the Oxide of Arsenic, reduced to a coarse powder, be exposed to heat in a suitable vessel, avoiding the vapours, that the White Oxide of Arsenic may be sublimed.

REMARKS.—The Oxide of Arsenic, the White Arsenic of Commerce, or Arsenious Acid of Chemists, is obtained in the roasting of metallic ores, particularly those of Cobalt. The Arsenical Oxide collects, in the horizontal flue connected with the furnace used for this process. It is extracted from the flue, and sublimed in iron vessels. During the latter process part of it becomes vitrified, and in this, as well as in the pulverulent form, it is used in commerce. To insure the absence of any fixed impurity, the volatility of the oxide is taken advantage of, and the process of sublimation directed. The operation may be performed in a vessel either of iron or of glass, and if a small quantity only of the purified oxide is required, a common oil flask may be used; and by cutting the flask according to the modes usually practised, the sublimed portion can be separated from the residue. In this way, two or three ounces of Oxide of Arsenic may be sublimed. The process should be carried on under a flue, and the operator should carefully avoid the fumes.

The Arseniate of Potash was the only arsenical preparation in the Dublin Pharmacopœia of 1807. The Oxide of Arsenic was introduced into the present Pharmacopœia, not because it was deemed a more satisfactory preparation, but from its more general adoption in other Pharmacopœias, and from the important advantage gained of uniformity in the application to medical use of this very active remedy.

In the Edinburgh Pharmacopœia, the sublimation of the White Arsenic of Commerce is omitted; but it is evident that increased certainty is obtained as to the purity of the Arsenious Acid, by observing the direction given in the Pharmacopœias of London and Dublin, of subliming this acid; and too much caution can scarcely be used in the application to medical use of a remedy so powerfully active as Arsenious Acid.

Arsenic forms with Oxygen, two distinct compounds, each having the properties of an acid;—1st. The Arsenious Acid, often named, as in this Pharmacopœia, white Oxide of Arsenic, and consisting of

1 Arsenic	=	38
2 Oxygen	=	16
		—
1 Arsenious Acid	=	54

2nd. The Arsenic Acid compounded of

1 Arsenic	=	38
3 Oxygen	=	24
		—
1 Arsenic Acid	=	62

The first of these, producing a salt by union with Potash in aqueous solution, is directed in this Pharmacopœia: the latter, combined with Soda, in form of a crystallized salt, was prescribed in the Pharmacopœia of 1807.

PROPERTIES, AND TESTS OF ITS PURITY.—Arsenious Acid, the White Arsenic of Commerce, occurs in the pulverulent form. It is also met with vitrified, when it is brittle, and has a conchoidal fracture. It is at first nearly transparent, but becomes opaque, or nearly so, from exposure to the air. By slow sublimation, it may be obtained in transparent needles, or in octahedral or tetrahedral crystals. Its specific gravity is variously stated; but the mean of different experiments is 3.72, compared with water taken as unity. Its taste is at first strongly metallic, but afterwards somewhat sweetish, and it is a most active poison. In cold water it dissolves with difficulty; in hot water with more rapidity. The quantity taken up by water is not easily ascertained. Bucholz asserted that Arsenious Acid required 50 times its weight of cold

water, and Klaproth, 400 times its weight, for solution. I have observed that water, after a sufficient time, lets fall the greater part of the acid: this will account for the varying reports of different experimenters as to its solubility.

It should rise when heated to the temperature of about 380° , without leaving any residue. Mixed with about two or three times its weight of dry black flux, or with the same quantity of dry charcoal, and exposed to a heat approaching to redness, it is decomposed, and the metal rises from the mixture with an odour strongly resembling that of garlic. If this experiment be made in a proper subliming vessel; a small glass tube from 1 to $\frac{3}{10}$ ths of an inch in diameter, and closed at one end, may be used; the metal is condensed in the colder part of the tube, and coats its internal surface with an opaque crust of a steel colour, and of the proper metallic brilliancy. By this method, metallic Arsenic can be obtained from all the salts containing arsenic. Being an acid, White Arsenic readily unites with water of Caustic Potash, and forms an Arsenite of Potash which remains dissolved; and this solution, when rendered neutral, affords a precipitate of a lively pea-green colour with most of the Salts of Copper. The same Arsenite of Potash, with neutral Nitrate of Silver, gives a bright yellow precipitate. The solution of Arsenious Acid in water, when a stronger acid, Muriatic, Tartaric, or Acetic, has been added to the water, to neutralize any alkali that may be present, and when Sulphuretted Hydrogen Gas is passed through it, becomes yellow, and deposits yellow Sulphuret of Arsenic. Should the deposition not take place immediately, the liquor should be boiled to expel the excess of Sulphuretted Hydrogen; or evaporated. Freezing the liquor is also said to cause the deposition. From the deposited Sulphuret, metallic Arsenic may be obtained by heating the yellow substance in a glass tube with

black flux in the manner above mentioned. Its complete sublimation by heat; its yielding metallic Arsenic when heated with black flux; its dissolving without leaving any residue, in water of Caustic Potash; and this solution yielding a pea-green precipitate with the neutral salts of copper, may be considered as the characteristic tests of its purity.

USES.—*Pharmaceutical*. It is used in preparing the Arsenical Liquor.

USES.—*Medicinal*. In the form of the aqueous solution of the arsenite of potash, as directed under the next head. The solution in water, as recommended by the late Dr. Darwin, is an uncertain remedy from the causes above mentioned.

In the arts it is applied to use chiefly in the manufactures of glass, and of shot for sportsmen. It is a most deadly poison, and when in the solid state its presence may be detected by sublimation as above described, and by reduction to the metallic form. When in solution in different animal or vegetable fluids, the ordinary tests of the Salts of Copper or of Silver may give ambiguous results. The best test Dr. Christison asserts to be, to add a small quantity of a stronger acid to the suspected solution, then to pass a current of Sulphuretted Hydrogen Gas through the liquor; expel the excess of Sulphuretted Hydrogen by heat, and collect the deposited yellow Sulphuret of Arsenic, dry it, and expose it to heat, with black flux, in a very narrow tube. Metallic Arsenic will rise from the mixture, and condense in the colder part of the tube.

The means recommended for obviating the effects of this poison are, copious dilution either with tepid water holding sugar dissolved, or with equal parts of lime water and sugar and water. According to the experiments of Orfila, the Sulphurets are not to be depended on as antidotes, but Sulphuretted Hydrogen, dissolved in water, is an effectual

remedy against Arsenious Acid when swallowed in watery solution, but not when it has been taken in the solid form. Fat substances, such as oil, butter, cream or grease, which are generally resorted to in such cases, were found by Orfila to be inefficacious or hurtful. Animals which had swallowed White Arsenic in butter or grease, died sooner than others who had taken it without this addition. When inflammation has set in, general blood-letting, or the application of leeches, with fomentations, tepid baths, emollient glysters, and narcotics, should be had recourse to. The proper antidotes for Arsenious Acid, when taken in the *solid* form, are not yet known. The poisonous particles attach themselves to the mucous coat of the stomach, and either remain there till death has taken place, or are not dislodged until effects have been produced which ultimately prove fatal.

ARSENICAL LIQUOR.

Take of sublimed white Oxide of Arsenic, pulverized,
Carbonate of Potash from Tartar, of each sixty
grains,
Compound Spirit of Lavender, *by measure*, four
drachms,
Distilled water, *by measure*, half a pint.

Boil together, in water contained in a glass vessel, the Oxide of Arsenic and Carbonate of Potash, until the oxide is dissolved. Add the compound Spirit of Lavender to the cold liquor, and so much of distilled water as that the quantity of the whole shall amount to a pint *by measure*.

REMARKS.—This is the preparation known by the name of Fowler's Arsenical Solution, because it was first recommended by Dr. Fowler, as a substitute for a quack medicine, sold under the name of the tasteless Ague Drop. To promote the action of the Alkaline Salt on the Arsenious Acid, we are directed to reduce the latter to powder, as it is a hard substance, little soluble in water. The purest Carbonate of Potash, namely, that obtained from Tartar, is directed, in order to insure the formation of an Arsenite of Potash. The Arsenious Acid unites to the Potash, expels the Carbonic Acid, and the Arsenite of Potash remains in the fluid.

The atomic quantities with the resulting changes are thus represented :

Materials.

1 Arsenious Acid	= 54	1 Carbonic Acid	= 22
		1 Potash	= 48
			<hr/>
		1 Carbonate of Potash	= 70

Products.

1 Arsenious Acid	= 54	1 Carbonic Acid	= 22
1 Potash	= 48		
	<hr/>		
1 Arsenite of Potash	= 102		

From this view of the composition of Arsenite of Potash, it appears that the quantity of Carbonate of Potash prescribed in the formula at the head of this article, is not sufficient to form the perfect salt, and that 60 grains of Arsenious Acid would have required 77.7 grains of Carbonate of Potash: but it was desirable that a prepara-

tion having such virulent properties should not in any important respect differ from that in common use. There is a slight deviation from the ordinary form, in the adoption of sixty instead of sixty-four grains for each pint of the fluid. This change was made on the supposition, that there would be less danger of error in the process of weighing, if only one weight, namely, that of a drachm, were to be used, than if the weights were to be many, or composed of several others. From this alteration, the liquor made according to the process of the Dublin Pharmacopœia, contains 1-16th part of Arsenious Acid less than the preparation of the Pharmacopœias of London and Edinburgh; and it contains but $3\frac{3}{4}$ grains of the active ingredient, instead of 4 grains, in each ounce *by measure*. Compound Spirit of Lavender is added for the purpose of giving a colour to the preparation, and to prevent its being mistaken for water.

PROPERTIES, AND TESTS OF ITS PURITY.—Evaporated to dryness it should leave a white salt, and this, when mixed with about an equal weight of dry charcoal in fine powder, and exposed to a red heat, in a small glass tube, closed at one end, should afford metallic Arsenic. When completely neutralized by Muriatic or Acetic Acid, it should yield a yellow deposit, when a stream of Sulphuretted Hydrogen is passed through it; and this deposit, when mixed with dry black flux, and exposed to heat in a small glass tube, in the manner above mentioned, should give a sublimate of metallic Arsenic.

USES.—*Medicinal*. It has been long used for the cure of intermittent fever, and it sometimes succeeds when Peruvian Bark has failed; but its noxious qualities, and the injury which the constitution is liable to suffer from the continued use of this remedy, should prevent its application as a medicine, except in cases which have resisted the use of other appropriate means. It has been

given in cases of Chorea with success. A severe case, under the care of Mr. Martin, was treated successfully by this remedy, as recorded in *Med. Chirurg. Trans.* v. 4. p. 45. Mr. Salter relates four cases of Chorea cured by means of this solution; *Med. Chirurg. Trans.* v. 10, p. 218: and Dr. Gregory one case successfully treated by the same remedy, v. 11, p. 299.

DOSE.—From four grains increased gradually to twenty *by measure*, three times in the day. The remedy should be discontinued when pains in the abdomen or other symptoms of visceral irritation succeed its use: and it should not be continued for a great length of time, since it accumulates in the system, as is observed to happen with the poison of Lead and some other metals.

SUBNITRATE OF BISMUTH.

Take of Bismuth reduced to powder, seven parts,
Diluted Nitric Acid, twenty parts,
Distilled water, one hundred parts.

Gradually add the Bismuth to the Acid, and dissolve with heat. Mix the liquor with the water and set aside the mixture, that the powder may subside: wash the powder with distilled water, and dry it on blotting paper with a gentle heat.

REMARKS.—This preparation is long known, having been prepared and sold as a cosmetic, under the name of Pearl White, or Magistery of Bismuth. It is now, for the first time introduced into the Dublin Pharmacopœia. The favourable accounts given of it as a remedy for certain kinds of Dyspepsia, led to its introduction. Bismuth

dissolves readily in Nitric Acid moderately diluted, and with abundant extrication of nitrous fumes, owing to the decomposition of that part of the Nitric Acid which converts the Bismuth into an Oxide. The compound thus formed, is analogous to that produced by Antimony with Muriatic Acid; being decomposed by water and the acid almost totally abstracted from the oxide: a portion of the Nitric Acid remains adhering to, or in combination with the Oxide of Bismuth. The following scheme gives a theoretical representation of the product formed by dissolving Bismuth in diluted Nitric Acid.

Materials.

3 Bismuth	= 216	4 Nitric Acid	= 216
		39 Water	= 351
<hr/>			
		Diluted Nitric Acid	= 567

Products.

3 Bismuth	= 216	1 Nitrogen	= 14
3 Oxygen	= 24	2 Oxygen	= 16
3 Nitric Acid	= 162		—
39 Water	= 351	1 Nitric Oxide Gas	= 30
<hr/>			
Diluted Nitrate of			
Bismuth	= 753		

When the product of Nitrate of Bismuth is passed into water, two atoms of the Nitric Acid are taken up by the water, and one atom of the Nitric Acid attaches itself to three atoms of the Oxide of Bismuth. Such is the view of this decomposition afforded by theory. But it is probable that the changes are more complicated, for a portion of the Oxide of Bismuth is carried off by the Nitric Acid,

and held in solution by the water. The proportion of Diluted Nitric Acid to Bismuth was adjusted from an experiment made by the writer; which shewed that 20 parts of diluted Nitric Acid dissolved seven parts of Bismuth. To preserve the colour of the precipitated Subnitrate, it should be kept in darkness, and vapours containing Sulphuretted Hydrogen should be carefully excluded; for, by these, even in very small quantity, its colour is quickly changed to brown.

Doubts have been entertained that this precipitate contained Nitric Acid; but I obtained Nitric Acid from it by the following method: for this purpose some of the precipitate, repeatedly washed with boiling water and then dried, was passed into a small retort; then moistened with water, a few drops of Sulphuric Acid added, and the mixture heated. An acid liquor came over, which applied to a clean plate of copper, produced an effervescence and dissolved the copper; and added to water of Caustic Potash on a piece of bibulous paper, gave to this, when dried, the property of burning with a deflagration similar to that of paper which has been soaked in a strong solution of Nitre and dried.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour should be a brilliant white. This will not be the case should it have been long exposed to the light or to the air of inhabited places. It should dissolve readily in diluted Nitric Acid; its solution should be decomposed when thrown into a large quantity of water, and a white powder abundantly deposited. This powder, when dried, on exposure to Sulphuretted Hydrogen Gas, immediately becomes brown. When heated in a crucible or before the flame of a blowpipe, the colour of the white precipitate first changes to yellow, then to reddish brown; with a red heat it assumes a brownish black colour, and on cooling it appears in the form of a transparent yellow glass, which, at a higher temperature is volatile. When

exposed to heat, in contact with a sufficient quantity of black flux, it should afford a metal having the properties of Bismuth.

USES.—*Medicinal.* It was recommended by Doctor Odier, of Geneva, in the treatment of Gastrodynia. The late Dr. Marcet reported favourably of its efficacy. Dr. Bardsley found it a valuable remedy in Gastrodynia, Cardialgia, Pyrosis, and other dyspeptic symptoms. Five out of six cases of Gastrodynia, and Pyrosis, were relieved by this remedy, and the remaining case was also relieved although the patient laboured under Scirrhus of the Pylorus. Its utility in these diseases has been confirmed by the reports of other physicians.

DOSE.—Dr. Odier gave it in doses of from one to twelve grains. Dr. Bardsley in doses of five grains, with twenty-five grains of Gum Tragacanth, three times in the day; Mons. Leroux in doses of ten grains three times in the day, and without causing any inconvenience. Its dose may be stated at from three to fifteen grains. Dr. Duncan remarks that it is blackened on passing through the bowels, as might be expected from the change produced in it by exposure to animal effluvia.

PREPARED SUBACETATE OF COPPER.

Let the Subacetate of Copper be triturated into powder, and let the finest parts be separated by the mode directed for the preparation of chalk.

REMARKS.—By this process, which is that of elutriation, the Subacetate of Copper or Verdigris of Commerce is obtained in a state of minute division.

Verdigris is prepared in the large way, principally in wine countries, by exposing clean plates of copper to the

action of the Acetic Acid produced in the husks and stalks of grapes after the wine has been expressed. The attraction of Acetic Acid for Oxide of Copper causes the copper to attract the requisite quantity of Oxygen from the atmosphere, and the oxide so formed unites to a portion of Acetic Acid, forming a Subacetate and an Acetate of Copper. The plates are placed with their surfaces in contact in a cellar, and by dipping in water and drying again, a process continued during some days, the plates become covered with a coating of verdigris, which is scraped off and dried in bags for sale. It is largely manufactured in the South of France. It is also made in England.

There are several compounds of Oxide of Copper and acetic Acid, which, according to theory, and the analysis of Mr. Phillips, are thus composed:

1st.—Dry Acetate consisting of

1 Peroxide of Copper	= 80
1 Acetic Acid	= 50
	—
1 Dry Acetate of Copper	= 130

2nd.—Hydrated Acetate of Copper composed of

1 Dry Acetate of Copper	= 130
6 Water	= 54
	—
1 Crystallized Acetate of Copper	= 184

This appears from Mr. Phillips's Analysis to be the Verdigris of Commerce. This, by the action of water, is resolved into Binacetate of Copper, and a green precipitate composed of one atom of Acetic Acid and two atoms of Peroxide of Copper. The latter appears to be the prepared Subacetate of Copper of this Pharmacopœia.

3rd.—Dry Peracetate or Binacetate of Copper, consisting of

1 Peroxide of Copper	= 80
2 Acetic Acid	= 100
	—
1 Dry Binacetate of Copper	= 180

4th.—Crystallized Peracetate or Binacetate of Copper, of which the composition is

1 Peroxide of Copper	= 80
2 Acetic Acid	= 100
3 Water	= 27
	—
1 Binacetate of Copper	= 207

This, according to Mr. Philips, is the composition of Crystallized Verdigris, in commerce improperly named Distilled Verdigris. In the process of elutriation the insoluble part remains long suspended, and is with difficulty separated by filtration.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour should be a fine bluish green. It should dissolve in distilled Vinegar, and aqueous solutions of it and of Baryta or its salts should not become turbid when mixed. Ammonia should at first render turbid the acetous solution of Verdigris, and by increase of the Ammonia, the liquor should become transparent, and assume a fine azure blue colour. A clean plate of iron immersed in the acid liquor, previously warmed, should acquire a rose-coloured incrustation of metallic Copper. The prepared Subacetate becomes brown when water is boiled on it.

USES.—*Pharmaceutical.* In preparing the Oxymel of Subacetate of Copper; also the Ointment of Subacetate of Copper.

USES.—*Medicinal.* It is applied externally as a mild escharotic, and to destroy fungous excrescences in ulcers. Used also as an application to ulcers of the mouth, tongue, or fauces. For these purposes it is generally applied in the form of Oxymel.

It is sometimes produced on the inside of copper vessels used to prepare pickles or preserves, more especially if the vegetable acid has been suffered to cool, for whilst hot the acid does not act on copper. The dangerous practice has also been adopted of communicating to pickles a green colour by means of copper. Hence it has been swallowed, and has acted as a poison. The antidotes are whites of eggs diffused through water and taken largely. Sugar is also found to correct the effects of copper when swallowed, and is considered by Orfila as an effectual antidote.

AMMONIATED COPPER.

Take of Sulphate of Copper, two parts,
Carbonate of Ammonia, three parts.

Let them be rubbed together in an earthen-ware mortar, until all effervescence having ceased, they coalesce into a mass. Let this be wrapped in bibulous paper, dried and kept in a bottle closed with a glass stopper.

REMARKS.—In this process the ingredients, when triturated together in a mortar, act on each other; an effervescence takes place, from the expulsion of Carbonic Acid Gas, the mixture becomes moist, and acquires a fine azure blue colour. This preparation is not the Ammoniacal Sulphate of Copper; which is made by uniting Sulphate of Ammonia with Sulphate of Cop-

per; but it may be a combination of this triple salt with an ammoniaco Carbonate of Copper; as the quantity of Carbonate or Sesquicarbonate of Ammonia employed is much more than would be equivalent to the formation of the triple Ammoniaco Sulphate of Copper.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is a deep azure blue. Taste strongly metallic. Supersaturated by Nitric or Muriatic Acid, a clean plate of iron throws down from the solution metallic Copper, or receives a rose-coloured coating of that metal. Exposed to heat, ammoniacal fumes are abundantly emitted.

USES.—*Medicinal.* It is employed chiefly in the treatment of Epilepsy, but in most instances with little or no benefit. It was brought into medical practice by the late Dr. Cullen of Edinburgh, who used to give it in small doses gradually increased. When in the course of a month it showed no effect, he desisted from its use, resuming it only a few days before the expected accession of the fit; he states that in this way he succeeded in removing the disease. It has also been given in Chorea with benefit.

WATER OF AMMONIATED COPPER.

Take of Ammoniated Copper, one part,
Distilled Water, one hundred parts.

Dissolve the Ammoniated Copper in the water, and filter it through paper.

REMARKS.—By this preparation we obtain a solution of Ammoniated Copper in water. It is observed, after some time, to undergo decomposition, and to deposit a part of the Oxide of Copper.

PROPERTIES AND TESTS OF ITS PURITY.—It should have a faint blue colour, and it should exhibit the qualities above described as proper to ammoniated copper.

USES.—*Medicinal.* It is sometimes applied to ulcers, to cause them to heal, and has been recommended as a stimulant application to the eyes, for the purpose of promoting the absorption of the effused matter which gives rise to specks on the cornea.

RUST OF IRON.

Take of iron drawn into wire any required quantity, which, moistened with water, is to be exposed to the air until becomes corroded into rust. Then let it be rubbed in an iron mortar, and by the affusion of water, let the most subtile powder be washed off and dried.

REMARKS.—When iron is exposed to air and humidity, its surface becomes oxidated, and the oxide takes up a minute portion of carbonic acid: ammonia also appears to be formed in small quantity, and to attach itself to the surface of the oxide. The change gradually pervades the entire mass of iron; the scales of rust loosen and fall off, so that the process of rusting, as is well known, produces a corrosion of the metal. In this process, iron wire is directed on account of its purity, and of the extensive surface which it exposes to oxidation. The particles which separate are to be triturated, for the purpose of forming a fine powder, and of detaching any metallic iron from the rust. To avoid the admixture of foreign substances with the rust, the trituration should be performed in an iron mortar. The process of elutria-

tion is prescribed, for the purpose of detaching any remaining metallic iron, and of obtaining the rust in a very subtile powder fitted for solution in an acid. A preparation of the same kind is directed in the Edinburgh Pharmacopœia, the process of elutriation being omitted. In the London Pharmacopœia the precipitated carbonate of iron is used as its substitute.

USES.—*Pharmaceutical.* In the preparation of the liquor of Muriate of Iron, for which purpose it is chiefly prepared, in compliance with usage.

—*Medicinal.* It is given as a tonic, and from its having little solubility in acids it is one of the least active of the oxides of iron. As an external and internal remedy it has been recommended in Cancer, and it is said to have proved efficacious in Tic Doloureux, but the precipitated Carbonate of Iron was probably administered for it. It has been given in very large doses, and long continued, with very little effect. Much activity should not be expected in a substance having so little solubility in the weaker acids.

DOSE.—From five grains to half a drachm, taken three times in the day.

SULPHATE OF IRON.

Take of Iron drawn into wire, four parts,
Sulphuric Acid, seven parts,
Water, sixty parts.

Mix.

Heat being applied, let the metal be dissolved, and the liquor filtered through paper. Finally, after proper evaporation, let it be set aside, that by slow refrigeration crystals may be formed.

REMARKS.—In this process, the attraction of Iron for Oxygen, aided by the disposing attraction of Sulphuric Acid for the oxide, causes a decomposition of water; an Oxide of Iron is formed which unites to the acid, and a solution of green Sulphate of Iron is produced, from which, by evaporating and refrigerating the liquor, crystals are obtained.

The atomic changes are represented in the following scheme:

Materials.

1 Iron	= 28	1 Sulphuric	} = 40	1 Liquid	
		Acid		} Sulphuric	
		1 Water	=		Acid	= 49
		46 Water			= 414
Total Sulphuric Acid and Water					<u>463</u>

Products.

1 Iron	= 28	} 1 protoxide of Iron	} = 36	1 Hydrogen Gas	= 1
1 Oxygen	= 8			39 Water eva-	} = 351
1 Sulphuric Acid		= 40	porated		
7 Water		= 63			
<hr/>				Total	<hr/>
1 Crystallized Sulphate of Iron				= 139	352

To determine the correspondence between the statement given in the late Dr. Wollaston's table of Chemical equivalents, the atomic representation of the substances employed, and actual results, the following experiment was carefully made. Sixteen grains of clean Iron Wire and 28 grs. of pure and recently boiled Sulphuric Acid, with 160 grains of Water, were exposed to heat, and suffered to rest until all action had ceased. There remained, of iron and impurities, only 0.43 grs.; of this

a small portion would have been dissolved, had the full quantity of Sulphuric Acid given in Dr. Wollaston's table, or 28.4 grs. been used. The result was, however, sufficiently satisfactory, and the quantities of iron and acid directed in this Pharmacopœia and in that of 1807, which are the same, so far as respects the iron and acid, will be found to be the true quantities, expressed as nearly as can be done by whole numbers. It evidently follows that the quantity of iron directed according to the processes of the London and Edinburgh Pharmacopœias, a quantity equal to that of the acid, is too great.

An alteration in the process of the Dublin College has been adopted, which considerably diminishes the labour of the operator. In the Pharmacopœia of 1807, the quantity of water was so small in proportion to that of the other materials, that when action had ceased, a great part of the liquor crystallized, and the residual impurities were mixed with the crystals. To separate these impurities without heating the liquor a second time, was impracticable. Such quantity of water is now prescribed, that when all action has ceased, and the solution cooled, the sulphate of iron shall remain dissolved; filtration may then be employed, and crystals obtained by the usual means.

According to the result of one experiment made by the writer, the quantity of crystallized sulphate of iron obtained, amounted to 4.6 times the weight of the iron employed.

PROPERTIES AND TESTS OF ITS PURITY.—It has an emerald green colour; the peculiar taste named chalybeate. It crystallizes in forms derivable from the oblique rhombic prism. The crystals dissolve in twice their weight of water at the temperature of 212° . The solution reddens Litmus paper. When heated to ebullition a partial decomposition of the salt takes place, and peroxide of iron united to some sulphuric acid falls down; a

similar change is produced by exposure to air. From the solution of the Sulphate of Iron, Ferroproussiate of Potash throws down a precipitate which is at first of a whitish colour, but rapidly becomes blue. Infusion of Galls gives a precipitate of a purplish black colour: a hydrosulphuret a deep black precipitate. When the crystals are exposed to a heat sufficient to expel the water, a greyish white powder is produced which is a dry persequisulphate of iron. By a strong heat the salt is more completely decomposed, the protoxide is changed into peroxide, which remains in form of a dark red mass united to a small quantity of Sulphuric acid, this, by washing, may be separated from it. It then exhibits the peroxide or red oxide of Iron, the Colcothar of commerce.

Crystallized Sulphate of Iron, in commerce denominated green vitriol, is obtained in the large way, by exposing to air and moisture or by roasting the native Sulphuret of Iron, lixiviating the product, and from the washings obtaining crystals by evaporation and cooling of the liquor. The Sulphate of Iron of Commerce is sometimes contaminated by Sulphate of Copper. This may be detected by immersing in the aqueous solution of the salt, a clean plate of iron, on which the copper will be deposited in form of a rose-coloured incrustation.

USES.—*Pharmaceutical.* For the preparations of Carbonate of Iron; red Oxide of Iron; Tincture of Acetate of Iron; Tincture of Acetate of Iron with Alcohol; Compound mixture of Iron.

—*Medicinal.* It is used as a tonic, and often in Amenorrhœa with benefit; especially when combined with the stimulant and fetid gums. It has been deemed somewhat beneficial in Diabetes; it is also supposed to have some anthelmintic power. When given in overdose it occasions griping pains, and vomiting.

DOSE.—From half a grain to four grains.

CARBONATE OF IRON.

Take of Sulphate of Iron twenty-five parts,
Carbonate of Soda twenty-six parts,
Water eight hundred parts.

Dissolve the Sulphate of Iron in the water, then add the Carbonate of Soda, previously dissolved in a sufficient quantity of water, and completely mix.

Let the Carbonate of Iron which subsides be washed with warm water, and let it then be dried.

REMARKS.—When to a solution of Sulphate of Iron in water we add Carbonate of Soda, a double decomposition takes place; Sulphate of Soda and insoluble Carbonate of Iron being formed. The latter, in drying, is changed into a mixture of Carbonate of Iron and Peroxide of Iron; the peroxide often forming the greater part of the compound. The proportion which the quantity of the Sulphate of Iron bears to that of Carbonate of Soda, as prescribed in the different Pharmacopœias, is as follows :

PHARMACOPŒIA.	SULPHATE OF IRON.	CARBONATE OF SODA.
	Ounces.	Ounces.
London	8	6
Edinburgh . . .	8	6
Dublin, 1807. . .	8	10
Dublin, 1826. . .	25	26

The following representation of the changes and atomic weights will show the quantities which should be employed.

Materials.

1 Protoxide of Iron = 36	} 1 Crystallized sulphate of Iron	} = 139	= 1 Soda = 32	} 1 Crystallized carbonate of Soda.	} = 144
1 Sulphuric Acid = 40			1 Carbonic Acid = 22		
7 Water = 63			10 Water = 90		
243 Water - - -		= 2187	243 Water =		2187
Dissolved Sulphate of Iron -		= 2326	Dissolved Carbonate of Soda =		2331

Products.

1 Protoxide of Iron	= 36	1 Sulphuric Acid	= 40
1 Carbonic Acid	= 22	1 Soda	= 32
	—	503 Water	= 4527
1 Proto Carbonate of Iron	= 58		
		Dissolved Sulphate of Soda	= 4599

A trial was made with the ingredients mixed in the proportion as above given, which corresponds very nearly with that prescribed in this Pharmacopœia; and the liquor from which the precipitate had subsided, was found to be colourless, neutral, and exhibited no trace of iron when examined with Ferropurssiate of Potash. In the same experiment two ounces of crystallized Sulphate of Iron afforded of dried precipitated Carbonate of Iron 300 grs.; the quantity should have been about 400 grs. The variation from the proper result may be accounted for by the changes which take place during the process of drying, from escape of Carbonic Acid, and change of the protoxide into peroxide of iron.

PROPERTIES AND TESTS OF ITS PURITY.—It should have a deep brown colour, and should completely dissolve with effervescence, in muriatic acid. Its solution should be decomposed by the Ferropurssiate of

Potash, affording a precipitate of a deep blue colour. Dr. Perceval many years ago ascertained, that it was more soluble than the oxides of iron in the weaker acids, and for this reason was probably more active as an internal remedy. It varies in its quantity of Carbonic acid, as well as in the state of the oxide, according to the mode of drying which is employed. If exposed to much heat it loses the greater part or the whole of its Carbonic Acid, and becomes similar to common rust of iron.

USES.—*Pharmaceutical.* In preparing Acetate of Iron.

—*Medicinal.* It is often given as a tonic remedy. In Amenorrhœa it is found useful, and also in Rickets; in the latter when combined with Phosphate of Lime. It was recommended in Cancer, and found to improve the appearance of the sore. It has also been found beneficial in Neuralgia. Dr. Elliotson tried it in traumatic Tetanus, and in two cases out of three it appeared to succeed.

DOSE—From one to four grains, when given merely as a tonic. In Neuralgia it has been given in doses of from half a drachm to four scruples three times in the day: and in traumatic Tetanus in doses of from two drachms to half an ounce every two hours, either in treacle or in strong beef tea.

BLACK OXIDE OF IRON.

Let the scales of Oxide of Iron, which are to be found at the smith's anvils, be washed with water; and when dried, let them be detached from impurities by application of a magnet. Then let them be reduced to powder, of which let the most subtile parts be detached, according to the mode directed for the preparation of chalk.

REMARKS.—No process is directed for obtaining this oxide of iron; common scales of iron from a smith's forge

being considered sufficiently pure for medical use. These are directed to be washed with water, in order to free them from accidental impurities. But it must be allowed, that the product thus obtained is a heterogeneous compound of protoxide, and peroxide, with metallic iron; for both the latter are found in the scales, and adhere so obstinately as not to be separable by the means here prescribed. A process is directed in the Parisian Pharmacopœia, which is said to afford a more perfect protoxide of the metal. This is effected, by covering iron filings or turnings with water, and by elutriation separating the fine black powder which is diffused through the liquor around the iron; and by drying this powder.

Pure Protoxide of Iron is composed of

1 Iron	=	28
1 Oxygen	=	8
		<hr/>
1 Protoxide of Iron	=	36

PROPERTIES, AND TESTS OF ITS PURITY.—It is a brittle substance easily pulverized, and of a bluish black colour. It should dissolve in Muriatic Acid, without effervescence, as this shows the presence of metallic iron. Its solution in this acid should have a deep green colour, yielding, with the alkalies, a precipitate of a whitish colour changing to green, and lastly to reddish brown; and with ferroproussiate of potash, a white precipitate rapidly acquiring a blue colour. As the scales of iron here directed always contain some peroxide of iron, they must exhibit some of the properties of that oxide.

USES.—*Medicinal.* The same as those assigned to the precipitated Carbonate of Iron, by which this preparation is now almost superseded. When it contains metallic iron it is said to produce frequent eructations.

DOSE.—The same as that of the precipitated Carbonate.

RED OXIDE OF IRON.

Let the Sulphate of Iron be exposed to heat, until the water of crystallization shall be expelled; then with a strong fire, let it be roasted, so long as an acid vapour rises. Let the red Oxide be washed until the washings, when examined by Litmus, shall appear free from acid; lastly, let it be dried on bibulous paper.

REMARKS.—In this process, Sulphate of Iron is decomposed by heat; its water of crystallization expelled, together with a large portion of the acid, and the protoxide is changed into peroxide of iron; to this the remaining acid adheres so loosely, as to be separable by mere washing, and it carries with it a small quantity of the peroxide.

The green Sulphate of Iron, when exposed to a heat quickly raised, swells up, effervesces, and becomes partly liquid; it then dries and assumes a greyish white colour: on increase of the heat, a large quantity of Sulphureous Acid Gas and dense white vapours rise from it, and it becomes of a deep red colour. On mixing the product with water, a solution of a dark red colour is obtained, but the greater part of the product subsides in form of a brownish red powder. The red liquor consists of Sulphuric Acid and Peroxide of Iron; the red powder, after repeated washings with hot water, becomes the red Oxide of Iron of the present Pharmacopœia. It is the substance known in commerce by the name of Colcothar.

Red Oxide of Iron is composed of

2 Iron	= 56
3 Oxygen	= 24
	—
1 Peroxide of Iron	= 80

From the composition assigned to Sulphate of Iron, it appears that 139 parts of this salt should yield 40 parts of Peroxide of Iron. The decomposition by heat of green Sulphate of Iron, commonly named green Copperas, green Vitriol, or martial Vitriol, is practised in some parts of the continent, for the purpose of procuring Sulphuric Acid or Oil of Vitriol of Commerce, which by this process is obtained, either of great density or absolutely free from water.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is a deep brown red. It is tasteless and insoluble in water. Heated in strong muriatic acid, it dissolves and yields a solution of a brown red colour. This affords a deep blue precipitate with the Ferroproussiate of Potash, and a purplish black precipitate with infusion of Galls. By the alkalies a brown red powder is thrown down.

USES.—*Pharmaceutical.* The only use to which it is applied is in preparing the plaster of Frankincense. In this case it merely gives a colour to the plaster.

LIQUOR OF MURIATE OF IRON.

Take of Rust of Iron one part,
Muriatic Acid,
Rectified spirit, of each six parts.

Pour the acid on the rust passed into a glass vessel, and occasionally stir the mixture during three days, then set it apart that the dregs may subside, and pour off the clear liquor; by slow evaporation reduce this to one third part, and when cold add to it the spirit.

REMARKS.—This is a solution of Peroxide of Iron in Muriatic Acid largely diluted with rectified spirit. It was formerly named Tincture of Muriate of Iron. The processes directed by the Colleges differ as to the quantity of acid and the kind of oxide to be employed. The London College prescribes a pint of acid, the Dublin, three pounds of acid, for half a pound of precipitated Carbonate of Iron; the Edinburgh College directs as much acid as may be sufficient for solution of the oxide, and this quantity it states to be about ten ounces for three ounces of purified black Oxide of Iron.

The form of the Dublin College directs the liquor to be evaporated, for the purpose of removing superabundant acid. The quantity of rectified spirit in proportion to the salt of iron is, according to all the forms, nearly the same. Of the different forms that of the Dublin Pharmacopœia seems the most eligible, in as much as a quantity of acid fully sufficient to dissolve the Carbonate of Iron is prescribed, and any excess of this acid, so far as this can be done, is removed.

This is a valuable preparation of iron, which, if preserved in a well stopped bottle, does not undergo decomposition.

PROPERTIES, AND TESTS OF ITS PURITY.—It should have a deep amber colour, with a strongly astringent taste, and somewhat ethereal smell. When diluted with water it should give a copious blue precipitate with the Ferroproussiate of potash; with Tincture or Infusion of Galls it should assume the colour of common writing ink. Nitrate of Silver causes an immediate deposition of Chloride of Silver. A solution of Acetate of Baryta produces no change. By the alkalies a brown red powder is thrown down. Mr. Brande states, that when prepared according to the London form, the preparation should have the specific gravity of 998, and the ounce

measured should contain about 34 grains of peroxide of iron.

USES.—*Medicinal.* It is a good tonic remedy, and is often given, in combination with the Muriate of Lime or of Baryta, in Scrofula. Its astringency has recommended it in hemorrhage, internal or external. It is useful in Dysuria arising from spasmodic stricture of the urethra, when given in small doses repeated every ten minutes. It sometimes proves anthelmintic. Its continued internal use requires caution, as it sometimes occasions headach, hardness of pulse, and other symptoms of overexcitement. It is occasionally employed as an external application to cancerous sores and for the removal of venereal warts.

DOSE.—From ten grains to twenty-five by *measure*, mixed with a proper quantity of water.

TARTAR OF IRON.

Take of Iron drawn into thin wire, one part,

Bitartrate of Potash triturated into a very
subtile powder, four parts,

Distilled water eight parts, or as much as
may be sufficient.

Let them be mixed, and exposed to the air during fifteen days in a wide vessel. Let the mixture, which is to be occasionally stirred, be kept constantly moist by the daily addition of water, taking care that the iron shall not be entirely covered by the water. Lastly, boil the product in a sufficient quantity of water, and let the filtered liquor evaporate to dryness over a water bath. Let the Tartar of Iron be kept in a well stopped vessel.

REMARKS.—In this process a triple salt, the Tartrate of Potash and Iron, is formed; the atom of Tartaric Acid which gives acidity to the tartar, being neutralized by protoxide of iron. The following scheme gives a theoretical representation of the changes which take place, conformably with the supposition, that the salt is composed of Tartrate of Potash and Tartrate of Iron.

Materials.

1 Iron	= 28	1 Potash	= 48
		2 Tartaric Acid	= 132
		2 Water	= 18
			—
		1 Bitartrate of Potash	= 198
		1 Water	= 9
			—
		Total	= 207

Products.

1 Protoxide of Iron	= 36	}	= 1 Tartrate of Iron	= 102	1 Hydrogen Gas = 1
1 Tartaric Acid	= 66				
1 Potash	48	}	= 1 Tartrate of Potash	= 114	
1 Tartaric Acid	66				
2 Water	-			= 18	
				—	
1 Tartrate of Potash and Iron				= 234	

When the iron wire and Bitartrate of Potash are mixed in a large dish with water, taking care not to cover the iron with the water, the liquor gradually acquires a light brown colour, which by degrees changes to a deep olive brown or almost black colour; the mixture at the same time acquires a glutinous consistency. By addition of water the tartar dissolves; the iron also gradually disappears; that part which remains in the course of

the process presenting a perfectly clean metallic surface. If the quantities of tartar and iron are properly adjusted they both disappear, and a deep olive brown coloured liquid is formed. The union will not be completed until two or three weeks have elapsed.

The action of the atmosphere is an essential requisite in this process. This I ascertained by careful experiments; for, when it was endeavoured to form the salt in a well closed vessel, completely excluding atmospheric air, the iron being at the same time covered with water, little or no reciprocal action of the materials could be observed at the end of fifteen days.

Experiments were made to determine which of the processes directed by the different Colleges should be preferred. 1st, When precipitated Carbonate of Iron, as directed in the Dublin Pharmacopœia of 1807, was mixed with the tartar and water, the prescribed quantities being employed, and the mixture made to boil, a large residue of both Tartar and Carbonate of Iron remained undissolved, although the liquor acquired a reddish brown colour, and on evaporation and cooling afforded green coloured Tartar of Iron. The product thus obtained was acid. 2d, When black Oxide of Iron was tried in place of the Carbonate, scarcely any union appeared to take place; for, when one ounce of tartar, half an ounce of black oxide of iron of this Pharmacopœia, and eight ounces of water were exposed to a boiling temperature, the filtered liquor, on evaporation and cooling, yielded only six grains of a viscid greenish white residue, not resembling the genuine triple salt. 3d, When metallic iron and tartar were used, mutual reaction gradually took place, and the whole of the tartar and iron disappeared, forming a dark brown coloured compound. This, when examined with test paper, appeared perfectly neutral, and when evaporated to dryness

left a mass of a resinous appearance, and completely soluble in water.

It is evident, from these experiments, that the process directed by the Dublin College, which corresponds in most respects, except as to the quantities of the ingredients employed, with the processes of the London and Edinburgh Pharmacopœias, affords a more abundant, as well as a more perfect product than the process of the former Dublin Pharmacopœia. It also resulted from experiment, that the precipitated Carbonate of Iron yields Tartar of Iron in so far only as the Carbonate contains protoxide of iron; and the black oxide of iron of the Pharmacopœias is unfit for the preparation of this triple salt. The only inconvenience attending the process here adopted is the length of time it requires.

PROPERTIES, AND TESTS OF ITS PURITY.—Colour, deep brown. It is brittle, and of a resinous consistency and lustre. Taste sweetish and agreeable. It readily dissolves in water, affording a solution of a deep olive brown colour, and it gives colour to a large quantity of water. It does not become blue, nor is it decomposed by a solution of the Ferropussiate of Potash, but it affords an abundant purplish black precipitate with infusion of Galls. It also yields a very copious white precipitate with a solution of the acetate of lead. When water of caustic potash is added to the solution of this triple salt, its colour is instantly changed from olive brown to brown red; but no deposition takes place until the mixture is heated nearly to ebullition, when peroxide of iron separates most abundantly; and by immediate filtration the whole of the oxide of iron may be obtained on the filter, but some of it is re-dissolved by the cold liquor. The dry tartar of iron exposed to a sufficient heat suffers decomposition, and with access of air appears combustible.

USES.—*Medicinal.* It is an agreeable preparation of iron, and may be given with advantage as a tonic in Amenorrhæa proceeding from debility, or in general relaxation of the system. Experience does not prove that it combines a diuretic with a tonic action, as was formerly supposed.

DOSE—From ten grains to half a drachm, given either dissolved in water or in form of a bolus.

ACETATE OF IRON.

Take of Carbonate of Iron, one part,

Acetic acid, six parts.

Digest during three days and filter.

REMARKS.—This is a solution of Protoxide and Peroxide of Iron in Acetic Acid. It is less liable to decomposition from exposure to air than the Tincture of Acetate of Iron, and may, in several instances, be used in place of that preparation. From the experiments of Dr. Perceval it appears that two drachms of Acetic Acid, spec. grav. 1065, digested with ten grains of precipitated Carbonate of Iron, afforded a deep claret-coloured solution; there was no residue, the whole of the carbonate being dissolved: with the same quantity of red Oxide of Iron, a light red coloured solution was formed, $1\frac{1}{4}$ grain being dissolved: with Iron filings a reddish amber coloured solution, and $3\frac{1}{4}$ grains were dissolved: with scales of Iron, a light amber-coloured solution, and only $\frac{1}{2}$ grain was taken up. The quantity dissolved in each case was inferred from the weight of the dried residue. From these experiments the carbonate appeared more soluble than either the oxides of iron, or the metal, it was therefore preferred for this preparation. The irregularity which is known to exist in the composition of the precipitated Carbonate of Iron,

must render variable the quantity of Oxide of Iron which the acetate contains.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is deep red. Taste acid and strongly chalybeate. It reddens Litmus; becomes blue with Ferroproussiate of Potash; purplish black with infusion of Galls; and when exposed to heat it yields acetic acid.

USES.—*Medicinal.* The same as those assigned to the preceding preparations of iron.

DOSE.—From ten to twenty-five grains *by measure*.

TINCTURE OF ACETATE OF IRON.

Take of Acetate of Potash, two parts,
Sulphate of Iron, one part,
Rectified spirit, twenty-six parts.

Rub together, in an earthen-ware mortar, the Acetate of Potash and Sulphate of Iron, until they unite into a mass; then let them be dried with a *medium* heat, and triturated with the spirit; let the mixture, with occasional stirring, be digested during seven days in a well stopped bottle; finally, let the tincture be poured off from the sediment, and preserved in a vessel perfectly closed.

REMARKS.—This preparation was introduced into the Dublin Pharmacopœia by Dr. Perceval. When Sulphate of Iron, and Acetate of Potash are mixed, the mixture becomes moist, an exchange of principles takes place, and Sulphate of Potash and Acetate of Iron are formed. From the mode of preparation adopted; by exposing the mixture to heat and air, for the purpose of drying it; some of the oxide of Iron must, by its conversion into peroxide, be rendered almost insoluble in the acid, in which case the preparation will contain an excess of acid:

Sulphate of Potash, one of the new products of this mixture, is insoluble in the rectified spirit, but the acetate of iron is taken up, and a tincture obtained of a deep claret colour. The digestion of the spirit on the ingredients should be performed in a well closed vessel, for if the materials were exposed to the air, the spirit would evaporate, the iron become a peroxide, and in this form separate from the materials. The change in the Oxide of Iron is furthered by increase of temperature; for this reason it is directed, that the heat shall not exceed a *medium* heat. It is probable that the compound dissolved by the spirit is a triple salt, or an Acetate of Potash and Iron, although experiment is yet wanting fully to confirm this opinion; there being no evidence in its favour, except that by using a quantity of Acetate of Potash amounting to double that of the Sulphate of Iron, a more permanent tincture is obtained, than if equal quantities were employed. The following scheme represents the atomic changes, conformably with the view that a triple salt is formed and held in solution by the spirit.

Materials.

2 Acetic Acid	= 100	1 Protoxide of Iron	= 36
2 Potash	= 96	1 Sulphuric Acid	= 40
	—	7 Water	= 63
2 Acetate of Potash	= 196		—
		1 Sulphate of Iron	= 139

Products.

1 Potash	= 48	1 Acetic Acid	= 50	} = 1 Acetate of
1 Sulphuric Acid	= 40	1 Potash	= 48	
	—	1 Acetic Acid	= 50	} = 1 Acetate of
1 Sulphate of Potash	= 88	1 Protoxide of Iron	= 36	
				Iron = 86
		1 Acetate of Potash and Iron		= 184
		7 Water evaporated		= 63
		Total	- - -	= 247

Should the preceding representation of this process be confirmed by experience, a more exact form of preparation will be obtained; which is very desirable, as when the tincture is made by the process of the Pharmacopœia, it is extremely liable to decomposition; and it frequently happens that the whole of the Iron separates in form of peroxide. This is less apt to occur, when the preparation is made with alcohol, as directed at the conclusion of this Pharmacopœia.

PROPERTIES, AND TESTS OF ITS PURITY.—It is of a deep claret colour and perfectly transparent, its taste strongly chalybeate. With the Ferroproussiate of Potash it gives a deep blue precipitate: a drachm *measured* of the tincture yielding $\frac{1}{20}$ th of a grain of Ferroproussiate of Iron, according to Dr. Perceval's experiments. When distilled it should afford spirit approaching in strength to rectified spirit, and the residue of this operation, when exposed to a sufficient heat, should yield acetic acid.

USES.—*Medicinal.* It is a valuable preparation, as it contains a solution of the oxide in a form very agreeable to the taste; and it is well adapted to those cases which are likely to receive benefit from the use of a chalybeate; accordingly it is given in Chlorosis with advantage; and as Dr. Perceval has recommended, may be conveniently administered in asses' milk.

DOSE—From half a drachm to a drachm by *measure*.

PURIFIED MERCURY.

Take of Mercury six parts.

Let four parts be slowly distilled.

REMARKS.—The intention of this process is to obtain pure Mercury. The foreign metals, by which it may be

contaminated, are those with which it forms a fluid compound, namely, Lead, Zinc, Tin, Bismuth: Gold and Silver might also be present. When amalgamated with Lead, the addition of Bismuth increases the fluidity of the mixture. A solid amalgam of Lead added to a solid amalgam of Bismuth produces a fluid compound. Of the preceding metals some are little disposed to rise with heat, others do not rise with the heat by which Mercury is volatilized. Of them all, Bismuth is most apt to pass over in distillation with the Mercury. Distillation is the mode prescribed by each of the Pharmacopœias for obtaining pure Mercury. For this purpose an earthen or an iron retort is best adapted, which should not be filled to more than one-third of its capacity with the Mercury; its neck, or a tube luted thereto, dipping into a vessel of water. In this case the body of the retort not occupied by the mercury may be filled with charcoal, to obviate the absorption of water into the retort, caused by condensation of the mercurial vapour. The distillation should be conducted with a heat merely sufficient to cause the Mercury to boil. The heat should be so applied as to envelope the retort on all sides, as otherwise the Mercury will be condensed on the colder part of the vessel. The form above given directs that the Mercury should be distilled slowly; as it has been ascertained that by rapid distillation some of the foreign metals are carried over with the Mercury. This may also happen from a great ebullition, by which some of the contents of the retort may be thrown into its neck, and into the receiver. The condensation first takes place in the neck of the retort and attached tube, in the form of most minute spherules, which collect into drops and trickle into the receiver; from this the Mercury should be removed, dried by exposure to heat, and preserved for use.

In this process some chemists recommend the addition of a small quantity of Cinnabar, for the purpose of re-

taining, by means of its sulphur, the foreign metals. Pure Mercury may be also obtained, by distilling either Cinnabar or Corrosive Sublimate, mixed with half its weight of Lime or Iron filings; but the mercury obtained by distillation, according to the process above given, is sufficiently pure. The addition of iron filings to the mercury, as directed by the Edinburgh college, can scarcely contribute to its purification, as Iron has little or no attraction for those metals by which Mercury is generally contaminated.

The Dublin form prescribes that two-thirds only of the Mercury shall be drawn off; this direction is given, because as the foreign metals increase in the proportion which they bear to the mercury in the retort during the progress of distillation, the risk of the ascent of these impurities and of their passing into the receiver is simultaneously increased. The Parisian Codex Medicamentarius directs that the open extremity of the neck of the retort or of the attached tube, shall be covered with linen tied to it and kept moist, through which the Mercury is to pass; in this case, the extremity of the retort should not dip into the water. The intention of the latter arrangement appears to be, to avoid a loss of Mercury by evaporation. The Mercury of commerce may also be purified by agitating it with strong Sulphuric Acid, or with water acidulated by Nitric Acid.

PROPERTIES, AND TESTS OF ITS PURITY. Mercury is fluid at all temperatures above—39°. Imperfect fluidity at ordinary temperatures denotes the presence of impurities, which appear when Mercury is extended on the surface of dry paper, porcelain, or glass; as, impure mercury in this form, or in moderate sized globules, when made to move, leaves after it a train consisting of the alloyed and oxidated metal. Lead is detected by agitating the impure mercury with diluted acetic acid and examining the filtered liquor by Sulphate of Soda, hydri-

odate or bichromate of Potash; the first of these producing a white and the two latter a yellow precipitate. The presence of Bismuth is ascertained by expelling the Mercury from the alloy by heat, dissolving the residue in diluted Nitric Acid, and throwing this into water, a white precipitate subsides, the colour of which is instantly changed by addition of Sulphuretted Hydrogen. Tin may be detected in the same residue, by dissolving it in Muriatic Acid, and adding to this a little Muriate of Gold, when the mixture will immediately acquire a purple colour; or by addition of a solution of Corrosive Sublimate, a black deposit of metallic mercury will be obtained.

Mercury expands by heat and contracts by cold, as exemplified in the mercurial Thermometer. At -39° it becomes solid, undergoing a remarkable contraction, and it then also crystallizes. - It boils at the temperature of 680° , and if pure, it evaporates without leaving any residue. Pure Mercury suffers no change when agitated in contact with Oxygen, Hydrogen, Azotic, Nitrous, Nitric Oxide, or Carbonic Acid gases, or with Alcohol; producing only a grey powder which is metallic mercury. This powder appears more rapidly with Water, Ether, Oil of Turpentine, or solutions of different salts; with sugar, flour, fatty or oily substances, and with the latter the mercury appears to be oxidated, as its colour increases in blackness from day to day. Mercury is acted on by strong Sulphuric Acid with the aid of heat, and by drying the mixture a white salt is obtained, which becomes yellow on the affusion of water. It is also acted on and dissolved by Nitric Acid; and this solution, sufficiently diluted with water, affords with Sulphuretted Hydrogen a black precipitate, which by standing or by agitation of the mixture becomes white: the addition to it of a solution of Corrosive Sublimate also changes the colour of the precipitate to white.

Mercury dissolves completely in Nitromuriatic acid, and the solution, when evaporated to dryness, leaves a white mass, which, on exposure to a sufficient heat rises completely in the form of Corrosive Sublimate. When in solution, mercury is detected by the immersion of a clean plate of copper, which immediately acquires a coating of metallic mercury, or causes a white deposit.

Its fluidity at ordinary temperatures; its rising on application of heat without undergoing any change, and its dissolving in Nitromuriatic Acid and yielding a solution, which when dried, and exposed to the process of sublimation, affords Corrosive Sublimate, may be considered as its characteristic properties.

USES.—*Pharmaceutical.* In preparing Mercury with Magnesia, Mercury with Chalk, black Oxide of Mercury, red Oxide of Mercury, Nitric Oxide of Mercury, Persulphate of Mercury, precipitated Calomel, and Acetate of Mercury.

MERCURY WITH MAGNESIA.

Take of purified Mercury,
Manna, of each two parts,
Carbonate of Magnesia, one part.

Rub the Mercury with the Magnesia in an earthen ware mortar, adding a few drops of water, that the mixture may have the consistency of a syrup, and that the metallic globules, by continued trituration may disappear; then add, still triturating, an eighth part of Carbonate of Magnesia. To the whole, thoroughly mixed, add of warm water sixteen parts, and let the mixture be stirred; then let it rest, and as soon as the sediment has subsided, let the liquor be decanted; repeat the washing again, and a third time, that the Manna may be com-

pletely washed off, then mix with the sediment ; whilst moist, the remainder of the Carbonate of Magnesia. Lastly, let the powder be dried on bibulous paper.

REMARKS.—In this process, by trituration with a viscid substance and exposure to air, the mercury becomes minutely divided, and is probably in part converted into protoxide : the manna serving the purpose of producing a minute division of the mercury. The trituration is directed to be continued until the globules shall cease to be visible, this being considered the test of a sufficient division of the metal. By the addition of water the manna is completely washed off ; and the mercury united to some oxide of mercury remains, and these whilst moist are mechanically combined with Carbonate of Magnesia and the mixture dried.

PROPERTIES, AND TESTS OF ITS PURITY.—It has a grey colour, and it partially dissolves with effervescence in Acetic Acid : the greyish black residue dissolves in diluted Nitric Acid, and yields with Hydrosulphuret of Ammonia, a black precipitate ; with Muriate of Soda, a white precipitate ; and a plate of copper immersed in the solution acquires a coating of metallic Mercury.

USES.—*Medicinal.* It is used as an alterative absorbent, and with this intention, is given to children.

MERCURY WITH CHALK,

Is to be prepared by a similar method, except that precipitated Carbonate of Lime is to be employed, in place of the Carbonate of Magnesia.

REMARKS.—This preparation is similar to the former, Chalk being used instead of the Carbonate of Magnesia.

PROPERTIES, AND TESTS OF ITS PURITY.—The presence of Carbonate of Lime in the mixture may be detected by addition of Acetic Acid, which dissolves the Carbonate of Lime with effervescence; and Oxalate of Lime immediately appears in the acetic solution, on adding to it Oxalate of Ammonia. The Mercury is discoverable by the means pointed out under the preparation of Mercury with Magnesia.

USES—*Medicinal*. This is used in the same cases as the preceding preparation, and is preferred to it, when the laxative action of the Magnesia might be objectionable.

BLACK OXIDE OF MERCURY.

Take of Sublimed Calomel, one part,
Water of Caustic Potash, made warm, four parts.

Let them be triturated together until an oxide of a black colour is obtained, and let this be frequently washed with water: lastly, let the oxide be dried with a *medium* heat on bibulous paper.

REMARKS.—By means of the water of Caustic Potash the Calomel is decomposed, its Chlorine abstracted in form of Muriatic Acid, and the Mercury converted into protoxide of Mercury.

The changes are represented in the following scheme:

Materials.

1 Mercury,	= 200	1 Potash,	= 48
1 Chlorine,	= 36	1 Oxygen = 8	} = 1 Water = 9
—	—	1 Hydrogen = 1	
1 Protochloride of Mercury, }	= 236	1 Hydrate of Potash,	= 57

Products.

1 Mercury,	= 200	1 Chlorine, = 36	} 1 Muriatic Acid, = 37
1 Oxygen,	= 8	1 Hydrogen, = 1	
	—	1 Potash,	= 48
1 Protoxide - of Mercury, }	= 208		—
		1 Muriate of Potash,	= 85

But the changes are not so simple as those here represented, for the protoxide of Mercury, separated by the Potash and Water, is partially resolved, by exposure to heat or light, into metallic Mercury and its peroxide, as noticed by M. Guibourt and M. Gay Lussac: See *Ann. de Chimie et de Physique*, v. i. p. 422; and a pure protoxide of Mercury is not yielded by the process here given.

PROPERTIES, AND TESTS OF ITS PURITY.—It should appear as a black powder, dissolving in Acetic Acid, or in much diluted Nitric Acid; the solution affording a black precipitate with the alkalies, and a white precipitate with solution of Muriate of Soda.

USES.—*Medicinal.* It has not been applied to internal medical use, nor can it, from the preceding views of its composition, be used in preparing Mercury with Chalk, or Mercury with Magnesia, as the presence of any peroxide of Mercury would impart to these preparations a much increased activity, rendering their use unsafe for children, to whom chiefly they are given.

RED OXIDE OF MERCURY.

Take of purified Mercury any required quantity, passed into a glass vessel with a narrow mouth and extended

bottom, let it be exposed to a heat of about six hundred degrees, until it is converted into red scales.

REMARKS.—When Mercury is exposed to a temperature exceeding 680° , the attraction for oxygen, aided by the elevated temperature and minute division caused by vaporization, gradually convert it into Peroxide of Mercury. When the process has been continued during some days, the surface of the metal becomes tarnished, and red scales form, these increase, and the whole mass at length changes into peroxide. The glass vessel used in this process, should have a flat bottom for the purpose of exposing an ample surface to the oxidating action of the atmosphere, and the depth of the Mercury should be inconsiderable; as the shocks produced by ebullition, in a mass of much depth, might endanger the vessel. None of the Mercurial vapours should be allowed to escape, but condensed in the neck, should fall to the bottom. To produce this effect the vessel should have a long neck, narrow at the mouth, which should be open; that by the expansion and contraction of the air within the vessel, caused by changes of temperature, fresh portions of atmospheric air may be introduced to supply the place of that decomposed by the Mercury. A vessel with two necks, one much longer than the other, would be well adapted for the process, as a continued circulation of the air would take place in such a vessel when exposed to heat. It should be immersed in sand. The product of this operation was long known by the name of Hydrargyrus præcipitatus per se, or Calcined Mercury.

It is composed of

1 Mercury,	= 200
2 Oxygen,	= 16
	<hr/>
1 Peroxide of Mercury,	= 216

PROPERTIES, AND TESTS OF ITS PURITY.—It appears in the form of small brilliant scales of a red colour. It is acrid, corrosive, and poisonous. When strongly heated it yields Oxygen Gas, and running Mercury, and evaporates without leaving any residue. It dissolves completely in diluted Nitric Acid, and its solution yields a yellow precipitate with the fixed alkalies. It also dissolves in Muriatic Acid, and this solution evaporated to dryness, and exposed to the heat requisite for sublimation, yields Corrosive Sublimate without leaving any residue.

USES.—*Medicinal.* It is seldom prescribed as an internal remedy, although some physicians and surgeons have considered it a very efficacious preparation. As might be expected from its great activity, it is apt to occasion vomiting or purging. It is sometimes used as an escharotic, either applied in powder or mixed with an ointment, but the Nitric Oxide of Mercury is generally preferred for this purpose.

DOSE.—From half a grain to two grains.

NITRIC OXIDE OF MERCURY.

Take of purified Mercury, two parts.

Diluted Nitric Acid, three parts.

Let the Mercury be dissolved, and let heat be applied until the dried mass passes into red scales.

REMARKS.—When diluted Nitric Acid, in a sufficient quantity, is added to Mercury and heat applied, an effervescence takes place and the metal gradually disappears. By continuance of the heat the mixture becomes dry, and a yellow mass is obtained; acid orange coloured

fumes are then abundantly disengaged, and the residue acquires an orange red colour; this, by continuance of the heat becomes a cinnabar red, but on cooling quickly resumes its former hue. When properly prepared it has a bright crystalline appearance. It is not easy to prepare it in the form here mentioned. Dr. Duncan states, that for the success of this process, it is requisite “1. That the Nitric Acid contain no Muriatic Acid. 2. That it be sufficiently strong. 3. That the evaporation be conducted with a moderate heat. 4. That the evaporating vessel be sufficiently large and flat, so that a large surface be exposed, and the whole equally heated. 5. That the heat be gradually augmented and steadily maintained during the whole time.” To this I would add, that the peroxide should be prepared with a large quantity of materials, which seems an essential requisite for obtaining it of the proper colour and crystalline appearance; and the process finished in the same vessel in which the evaporation has been effected, and without stirring the residue. The crystalline appearance is supposed to arise from the peroxide retaining some of the form of the crystals from which it was produced. It has been questioned whether this was a pure peroxide of Mercury, or consisted of the peroxide united to a small quantity of Nitric Acid. From Mr. Brande’s account of the result of the manufacture at the Apothecaries’ Hall, London, it is evident that the product must contain some Nitric Acid; for 100lbs. of Mercury boiled with 48lbs. of Nitric Acid, specific gravity 1.48, yield 112lbs. of Nitric Oxide of Mercury. If a pure oxide were formed, its quantity should not exceed 108lbs: the excess can only be accounted for by the adhesion of some Nitric Acid. To this it probably owes its brilliant scarlet colour, differing from that of the peroxide obtained by heat. The atomic changes may be thus represented,

Materials.

3 Mercury,	= 600	4 Nitrogen, = 56	} = 4 Nitric Acid, = 216
		20 Oxygen, = 160	
		39 Water, - - - = 351	
		4 Diluted Nitric Acid,	= 567

Products.

3 Mercury,	= 600	2 Nitric Acid volatilized,	= 108
6 Oxygen,	= 48	4 Oxygen, = 32	} = 2 Nitric Oxide Gas = 60
	—	2 Nitrogen, = 28	
2 Peroxide of } Mercury,	= 648	39 Water, - - -	= 351
		Total, - - -	= 519

It would appear from this scheme, that half the quantity of Nitric Acid here stated would be sufficient to convert the Mercury into peroxide; but on making the experiment it is found that much of the acid is lost by evaporation, and this loss must be compensated by using, in the first instance, more acid than the metal would require on a simple view of the atomic quantities of the Oxygen in Peroxide of Mercury and Nitric Acid respectively.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is a bright tile red or scarlet, lighter than that of peroxide of Mercury obtained by heat. It has a somewhat crystalline and brilliant appearance. Exposed to heat it assumes a much deeper hue, and it is decomposed into Oxygen Gas and running Mercury, evaporating completely without leaving any residue. It is in a slight degree soluble in water. In an experiment which I made, 1000 parts of boiling water did not take up more than 0.62 of this oxide. The nitric Oxide of Mercury

should dissolve completely in Muriatic Acid, and the solution evaporated to dryness and exposed to a sufficient heat, should afford Corrosive Sublimate without leaving any residue. Its admixture with red lead, a fraud which is said to be sometimes practised, may, by these means, be at once detected.

USES—*Pharmaceutical*. In preparing ointment of Nitric Oxide of Mercury.

—*Medicinal*. As an escharotic, and for destroying fungous excrescences. It is also used as a stimulating application to sores, and often to cancers. For these purposes it is employed either in fine powder or in form of an ointment. Dr. A. T. Thomson states, that mixed with eight times its weight of sugar, it is blown into the eye to remove specks on the cornea. It is not used internally, being considered more dangerously active than the peroxide of Mercury obtained by heat.

PERSULPHATE OF MERCURY.

Take of purified Mercury,
Sulphuric Acid, of each six parts.
Nitric Acid, one part.

Let them be exposed to heat in a glass vessel, and let the fire be increased until the thoroughly dried residue shall have become white.

REMARKS.—In this process, by decomposition of the Nitric and Sulphuric Acids, Mercury is converted into a peroxide, and the product is combined with Sulphuric Acid. When heat is applied to the mixture an effervescence commences, orange coloured fumes are disengaged, the Mercury becomes encrusted with a greyish

white salt, of which the quantity increases with the diminution of the Mercury. Sulphureous fumes are then disengaged, and by continuance of the heat, the whole of the metal is changed into a white dry salt.

The atomic changes in this case may be thus represented, conformably with the supposition that the quantity of Nitric Acid employed is sufficient for the oxidation of the Mercury :

Materials.

3 Mercury = 600	2 Nitrogen = 28	} = 2 Nitric Acid, } = sp. grav. 1590, }	= 126
	10 Oxygen = 80		
	2 Water = 18		
	6 Sulphuric Acid = 240	} = Oil of } Vitriol }	= 294
	6 Water = 54		
	Total Acids . . .		= 420

Products.

3 Mercury = 600	} = 3 Per- } oxide of } Mercury. }	= 648	2 Nitrogen = 28	{ = 2 Nitric } Oxide Gas }	= 60
6 Oxygen = 48			4 Oxygen = 32		
6 Sulphuric Acid . . .		= 240	8 Water volatilized . . .		= 72
3 Bipersulphate of Mercury, = 888			Total volatilized products		= 132

The Persulphate of Mercury of this Pharmacopœia, is therefore a Bipersulphate.

This preparation might be made without the Nitric Acid; according to the forms of the Dublin Pharmacopœia of 1807, and of the Edinburgh Pharmacopœia; the Mercury being oxidated by a part of the Sulphuric Acid; but the addition of Nitric Acid much facilitates the process, which is completed in a much shorter time than if Sulphuric Acid alone were made to act on the metal. The conversion of the Mercury into Peroxide is essential to the complete success of this process, and the use of the Nitric Acid appears to insure this change: in some comparative experiments which I made, a much whiter salt was obtained, when Nitric Acid was added to the Sulphuric Acid, than by the latter acid alone. This

salt was directed in the Pharmacopœia of 1807, under the heads both of Sulphuric Oxide of Mercury, and of Corrosive Muriate of Mercury; and two parts of Mercury with three parts of Sulphuric Acid were prescribed for its preparation. These quantities were also directed in the Edinburgh Pharmacopœia. Conformably with the atomic representation of the component parts of Sulphuric Acid and Bipersulphate of Mercury, 600 parts of Mercury would require 588 parts of strong Sulphuric Acid for the production of this salt; and if the quantity of Nitric Acid prescribed were sufficient for the conversion of the Mercury into Peroxide, 600 parts of Mercury would require 294 parts only, of strong Sulphuric Acid, instead of 600 parts, the quantity directed in this Pharmacopœia. The excess of Sulphuric Acid was prescribed, for the purpose of compensating for the deficiency in the quantity of Nitric Acid requisite for producing a peroxide of Mercury. For, if the quantity of Acid were not sufficient, some Bisulphate of Mercury would be formed, which decomposed by water, would yield Sulphate of Mercury of a white colour. This would render the salt unfit for the preparation of either the Sulphuric Oxide of Mercury, or the Corrosive Muriate of Mercury.

On repeating this experiment with the quantities taken in the proportions as prescribed in the form above given of this Pharmacopœia, I found that 200 parts of Mercury yielded nearly 291 instead of 296 parts, as indicated by theory. Some of the Mercury or of the salt might have been volatilized during the solution of the Mercury, or in the process of drying the salt.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is white. When pulverized and thrown into water it instantly assumes a bright yellow colour and mixed with dry Muriate of Soda; *Chloride of Sodium*; in the proportion of 296 of the former to 120 of the latter, and exposed to a heat sufficient to produce sublimation, it

should yield Corrosive Sublimate; *Bichloride of Mercury*; with residual Sulphate of Soda.

USES.—*Pharmaceutical*. In the preparation of the Sulphuric Oxide of Mercury and in that of Corrosive Muriate of Mercury. As Bipersulphate of Mercury is used in preparing both these salts, the introduction of a form for its preparation is an obvious improvement; the repetition of the form in the Pharmacopœia being avoided, and the operator saved the trouble of preparing it twice instead of once. It is not used as an internal or external remedy.

SULPHURIC OXIDE OF MERCURY.

Take of the Persulphate of Mercury one part,
Warm Water, twenty parts.

Triturate them together in an earthen-ware mortar, and pour off the supernatant liquor: let the yellow powder be washed with distilled water, so long as the decanted fluid exhibits any deposit on the addition of some drops of the water of Caustic Potash; lastly, let the Sulphuric Oxide of Mercury be dried.

REMARKS.—In this process the Persulphate of Mercury is decomposed by the water, and a portion of its Sulphuric Acid is taken away; this carries with it some of the residual salt, and a yellow compound of peroxide of Mercury and Sulphuric Acid remains, long known by the name of Turpeth Mineral, or Queen's Yellow. The changes in this case are theoretically represented as follows:

Materials.

1 Peroxide of Mercury	= 216	100 Water	= 900
2 Sulphuric Acid	= 80		
<hr/>			
2 Bipersulphate of Mercury	= 296		

Products.

1 Peroxide of Mercury	= 216	100 Water	= 900
1 Sulphuric Acid	= 40	1 Sulphuric Acid,	= 40
<hr/>			
1 Persulphate of Mercury	= 256	Sulphuric Acid	} = 940
		and Water	
<hr/>			

The above statement of its composition agrees nearly with the analysis of Braamcamp and Siqueira Oliva; *Annales de Chimie*, T. 54. p. 123; with this difference, however, that according to these chemists, 216 parts of Peroxide of Mercury unite with but 38 instead of 40 parts, the true atomic quantity of Sulphuric Acid.

The water used in this process should be hot, the Mercurial salt acquiring a deeper colour; the decomposition being probably more complete; with hot, than with cold water.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is lemon-yellow. Taste somewhat acrid. When exposed to heat it quickly acquires a red colour, which passes to brown red: this colour it retains so long as the heat is continued, but it resumes its former yellow hue on cooling.* It dissolves in 2000 parts of water at the temperature of 60°, and in 600 parts of boiling water. According to the experiments of Mr. Donovan; Thomson's *Annals*, V. 14, p. 323; the Sulphuric Acid is completely abstracted from it by Potash, and a pure peroxide of Mercury remains. Exposed to a sufficient heat it is decomposed, yielding metallic Mercury and evaporating without leaving any residue. In fixity it exceeds Mercury.

USES.—*Medicinal*. Taken internally it acts as a rough emetic, and when given with this view, it is apt to excite

* As observed by the writer.

salivation. It is sometimes used in cases of swelled testicle, to promote absorption by its nauseating and emetic action. It is a powerful errhine, but it is found necessary to moderate its action by uniting it with liquorice powder; in this form it is sometimes administered in Chronic Ophthalmia and incipient Hydrocephalus. When thus used it has been known to cause salivation.

DOSE—From one to five grains. In the latter dose it is violently emetic, and is rarely used to excite vomiting.

CORROSIVE MURIATE OF MERCURY.

Take of Persulphate of Mercury, five parts,
Dried Muriate of Soda, two parts.

Let them be well rubbed together in an earthen-ware mortar, that a most subtile powder may be formed, then with a heat gradually raised, let the Corrosive Muriate of Mercury be sublimed into a proper receiver.

REMARKS.—The common name of the preparation thus obtained is Corrosive Sublimate. According to the process here directed, the Bipersulphate of Mercury, the Persulphate of this Pharmacopœia, is applied to dry Muriate of Soda, or Chloride of Sodium: by the aid of heat a new arrangement of the principles is produced; the combined attractions of Sodium for Oxygen and Sulphuric Acid, and of Mercury for Chlorine, give rise to the formation of Sulphate of Soda and Bichloride of Mercury, and the latter being volatile when heated, is detached from the other principles of the mixture. Various processes have been employed for this preparation, but that here prescribed, which was invented by Kunkel, is as effectual and cheap as any hitherto practised.

The apparatus used should be an Alembic, with its head, in which the Bichloride or Corrosive Muriate of Mercury is condensed. The ingredients should be dry and well mixed, as on this the complete success of the process depends. The quantities to be employed, and the changes produced, may be seen by reference to the following scheme.

Materials.

1 Mercury	= 200	2 Sodium	= 48
2 Oxygen	= 16	2 Chlorine	= 72
2 Sulphuric Acid	= 80		—
	—	2 Chloride of Sodium	= 120
2 Bipersulphate of Mercury	= 296		

Products.

1 Mercury	= 200	2 Sodium	= 48
2 Chlorine	= 72	2 Oxygen	= 16
	—	2 Sulphuric Acid	= 80
1 Bichloride of Mercury	= 272		—
		2 Dry Sulphate of Soda	} = 144

From this view of the process, it is evident that the dried Muriate of Soda and Persulphate of Mercury are directed very nearly in the just proportion; for, $120 : 296 :: 2 : 4.93$. Mr. Brande states, that at the Apothecaries' Hall, London, 50lbs of Mercury with 70lbs of Sulphuric Acid, produce 73lbs of Persulphate of Mercury, which, mixed with 120lbs of common salt and sublimed, yield from 63 to 65 lbs of Corrosive sublimate. It would appear from the view of the atomic quantities given in the above scheme, that much too large a quantity of Muriate of Soda was employed, as 50 parts of Mercury would form 74 parts of Bipersulphate, for the decomposition of which but 30 parts of sea salt would

be required; and that this is the case I ascertained by experiments carefully conducted: 1. It was found that as much Corrosive Sublimate was yielded by dried Muriate of Soda, combined in the proper atomic proportion with the Bipersulphate of Mercury, as when equal quantities of the two salts were employed: 100 parts of Muriate of Soda, or 40 parts of the same salt with 100 parts of Bipersulphate of Mercury, yielding a quantity of Corrosive Sublimate varying only from 91.5 to 90.38 parts; the difference obviously depending on the care used in mixing the ingredients, or the length of time during which the heat was applied. 2. When the materials taken in the proper atomic proportion were well mixed by long trituration and exposed to a heat, continued until all vapours had ceased to rise, the residue of the operation was found to be completely soluble in water, and to contain no salt of Mercury, as appeared on examining it with either water of Caustic Ammonia or with water of Caustic Potash, neither of which produced any deposit in the liquor. The conclusion from these experiments is, that with proper care, Bipersulphate of Mercury and dried Muriate of Soda mixed in the proportion pointed out by the atomic theory, produce a complete reciprocal decomposition, and that the quantities directed in this Pharmacopœia are very nearly correct.

PROPERTIES, AND TESTS OF ITS PURITY.—The colour of Corrosive Muriate of Mercury is pure white. It is semitransparent. Its taste is styptic and strongly metallic, and it is a most active poison. It crystallizes in the form of flat four-sided prisms with two-sided summits, when it is obtained from an aqueous solution: when obtained by sublimation it appears composed of a congeries of minute needles, or as a compact mass, with a foliated and glassy fracture. From exposure to air it suffers little change. When sufficiently heated it rises in white fumes, leaving no residue, and

suffering no change from this operation. It dissolves in about eighteen and half times its weight of water, and in about two and half times its weight of Alcohol, at the mean atmospheric temperature. Nitric Acid of spec. grav. 1.410 scarcely dissolves $\frac{1}{500}$ th of its weight of Corrosive Sublimate : strong sulphuric acid does not dissolve $\frac{1}{630}$ th of its weight. Neither of these acids decomposed it even at high temperatures, according to the experiments of Dr. J. Davy, Phil. Trans. 1822. It changes the colour of infusion of violets to green ; water of ammonia produces in its solution a white precipitate ; water of Caustic Potash, a tile red or yellow precipitate. Fresh prepared Muriate of Tin added in sufficient quantity, completely decomposes it, throwing down metallic mercury, the mixture assuming a bluish black colour. By a clean plate of Copper, Calomel is separated, together with some Mercury, part of which forms an amalgam with the copper.

USES—*Pharmaceutical*. It was formerly directed in the preparation of Sublimed Calomel, as in the Dublin Pharmacopœia of 1807 ; but a cheaper and equally efficacious process is now adopted.

In the London Pharmacopœia, a form for a solution of Corrosive Sublimate in water, with the addition of a small quantity of spirit, is directed. This is a convenient preparation not yet introduced into the Dublin Pharmacopœia.

—*Medicinal*. Externally applied, Corrosive Muriate of Mercury is highly stimulant and escharotic, and it cannot be thus used without much caution. It is sometimes applied for destroying fungous flesh. Taken internally it acts as an alterative and stimulant, and on the authorities of Boerhaave and Van Swieten was formerly much used in the cure of Syphilis, though now it is less depended on. It is asserted that the symptoms are apt to return when removed by means of this remedy. In

eruptions and sore throat, Corrosive Sublimate is deemed more useful than in other forms of Syphilis. It is said to be the basis of vegetable syrups sold as quack remedies, and to be the active ingredient of a remedy of this kind, sold under the name of Velno's Vegetable Syrup. A solution of Corrosive Sublimate in spirit is used in some parts of this country as an empirical remedy. It has been swallowed as a poison, in which case symptoms are produced not unlike those of Cholera, but accompanied by great pain over the whole course of the alimentary canal, particularly severe in the pharynx, with convulsive motions of the limbs, cramps, faintings, and death. Similar effects have succeeded the external application of Corrosive Sublimate to a raw surface. The best antidote is white of eggs mixed with water, for Corrosive Sublimate is decomposed by albumen and changed into Calomel; if eggs cannot be procured, wheat flour diffused through water may be used, as this is also found to oppose the virulent action of Corrosive Sublimate, by the gluten which it contains; this use of gluten or wheat flour was discovered by Dr. Taddie, and is recommended by Dr. Duncan; Supplement to the Dispensatory, p. 140. Decoction of Flaxseed, of Marshmallow, Rice-water, Sugared-water and glutinous broths may be also given. Copious dilution should at the same time be employed, and if vomiting cannot be induced, recourse should be had to the use of the stomach pump.

DOSE.—From one-eighth to one-fourth of a grain, given either in form of pill made with crumb of bread, or better, in solution; the patient swallowing after each dose, a few ounces of infusion of flax seed.

SUBLIMED CALOMEL.

Take of Persulphate of Mercury, twenty-five parts,
Purified Mercury, seventeen parts,
Dried Muriate of Soda, ten parts.

Let the Persulphate of Mercury and purified Mercury be triturated together in an earthen-ware mortar, until the metallic globules shall have completely disappeared, then let the dried Muriate of Soda be added: let them be well mixed, and in a suitable vessel with a heat gradually raised, let them be sublimed into a receiver; let the sublimed mass be reduced to powder and washed with water, so long as the decanted liquor on addition of water of Caustic Potash shall exhibit any deposition; lastly, let the sublimed calomel be dried.

REMARKS.—Of this process two explanations may be given. 1. That Bipersulphate of Mercury by trituration with Mercury, is changed into Sulphate of Mercury, which, mixed with Chloride of Sodium and exposed to heat, exchanges principles with the Sulphate, and forms Chloride of Mercury, and this being volatile is separated from the mixture by sublimation; or 2. That Mercury in a state of very minute division is diffused through the mixture of this metal with Bipersulphate of Mercury and Chloride of Sodium, and when the Bipersulphate of Mercury and Chloride of Sodium reciprocally act, and form Corrosive Muriate of Mercury, the latter compound meeting with the minutely divided metallic Mercury, unites with it and produces Calomel, which is separated from the mixture by sublimation. Of the two modes of explanation, the latter appears the more probable; since Mercury can scarcely be supposed capable of forming by mere trituration with Bipersulphate of Mercury a sul-

phate of that metal, and as experiment shows, that Corrosive Muriate of Mercury and metallic Mercury, when in contact and exposed to heat, unite and form Calomel.

The mode of preparing Calomel adopted in this and the London Pharmacopœia, is a considerable improvement on the processes hitherto followed. Since, according to former methods, Corrosive Muriate of Mercury was produced by one process, and by a second process Calomel was obtained. Now, a single operation is sufficient for this purpose, the addition of Mercury to the materials used for the production of Corrosive Muriate, when sublimation is performed, converting the Corrosive Muriate into Calomel.

The materials should be very intimately mixed; the direction given, that the trituration shall be continued until the metallic globules have disappeared, insures the attainment of this object. The following scheme will explain the changes, and show the atomic quantities transferred in this process.

Materials.

1 Mercury,	= 200	2 Sodium,	= 48
2 Oxygen,	= 16	2 Chlorine,	= 72
2 Sulphuric Acid,	= 80		—
2 Bipersulphate of } Mercury,	— = 296	2 Chloride of Sodium,	= 120
	1 Mercury, = 200		

Products.

2 Mercury,	= 400	2 Sodium,	= 48
2 Chlorine,	= 72	2 Oxygen,	= 16
	—	2 Sulphuric Acid,	= 80
2 Chloride of Mercury,	= 472		—
		2 Sulphate of Soda,	= 144

The materials used in the process of this Pharmacopœia are united in the proportion derived from reference to the atomic representation of the quantities, as in the preparation of the Corrosive Muriate, and with an equally accurate result. The London College directs that the product shall be washed with a solution of Muriate of Ammonia. The object of this direction is to insure the absence of any adhering Corrosive Muriate of Mercury, which forms with Muriate of Ammonia a very soluble triple salt; but it has been observed by Mr. Hennell; *Journ. of Science*, V. 18. p. 295; that a boiling solution of Muriate of Ammonia decomposes Calomel into Corrosive Muriate and running Mercury; the Corrosive Muriate forming with Muriate of Ammonia, the soluble triple salt, Muriate of Mercury and Ammonia. Now, although it is not directed that the solution of Muriate of Ammonia shall be heated, yet as it may be employed hot, and as a decomposition of the Calomel and production of Corrosive Muriate would follow, the use of Muriate of Ammonia in washing the Calomel should be avoided. The Dublin College directs, that to free it from any adhering Corrosive Muriate of Mercury, the Calomel shall be washed with water only, and to insure a perfect contact between the salt and the water, that the Calomel shall be first reduced to powder.

The presence of Corrosive Sublimate in the washings is to be detected by water of Caustic Potash, which yields with Corrosive Sublimate a yellow precipitate when the latter salt is present in a minute quantity.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is white with a tinge of yellow. When scratched it leaves a buff-coloured trace; it is tasteless. Calomel is generally considered to have a slight degree of solubility in water, but Mr. Brande, from experiments carefully made by him, has showed it to be quite insoluble. Atmospheric air produces no change in Calomel, but it acquires

a dark tinge from exposure to light. When heated sufficiently it rises in white vapours without suffering any decomposition. By the fixed alkalies, or alkaline earths, dissolved in water, it is decomposed and acquires a black colour. It also becomes of a grey black when thrown into a fresh prepared solution of Muriate of Tin, running Mercury being detached from it. When Calomel is washed with a small quantity of water or rectified spirit, the washings should not contain Corrosive Muriate of Mercury. The complete sublimation of Calomel by heat, and its change of colour from application of alkaline or earthy solutions and from Muriate of Tin, may be adopted as its characteristic properties.

USES—*Pharmaceutical*. It is used in preparing the black Oxide of Mercury of this Pharmacopœia, and it forms a part of the compound pills of Calomel.

—*Medicinal*. It is given both as an alterative and a purgative. It is frequently given in small doses long continued, for the purpose of producing mercurial action in the system. Taken in small doses it does not act as a purgative, but is absorbed. It increases most or all the excretions, and if continued for a sufficient time, it produces salivation. This effect will sometimes arise from one or two grains. It promotes the specific action of other remedies: hence, it is often given in combination with purgatives, sudorifics, or diuretics, to increase their effects. Although there is reason to suppose that it is absorbed, yet Dr. Bostock ascertained by careful experiments, that no Mercury is present in the saliva of persons undergoing profuse salivation. It is probable that this observation extends to those cases in which salivation is produced by Calomel.

It is much used as a purgative, and is very effectual when given in sufficient dose. There appear to be certain limits, within which the purgative action of Calomel is exerted. Below a certain small dose, it has no

purgative effect, when the quantity sufficient to produce purgative action has been arrived at, an increased quantity of Calomel will add to the effect, but a limit will at last be attained when an increase of dose will not augment the purgative operation. It is supposed to act principally on the upper part of the intestinal canal, and to exert at the same time a specific action on the biliary system. It is sometimes used for mercurial fumigations. Mixed with sugar and inhaled through the nostrils, it is recommended as an errhine; and blown into the eyes, for removing specks on the cornea.

DOSE.—From one-third of a grain to two grains as an alterative; from one grain to eight grains as a purgative. Calomel may be given to children in larger dose than in the usual proportion of dose to age of the patient. It is best given in the form of a pill, or mixed with some tenacious powder or viscous fluid.

PRECIPITATED CALOMEL.

Take of purified Mercury, seventeen parts,
Diluted Nitric Acid, fifteen parts.

On the Mercury passed into a glass vessel, pour the acid, and when the mixture shall have ceased to effervesce, digest with a *medium* heat during six hours, occasionally stirring it; then let the heat be increased that the liquor may boil for a short time, and let this be poured off from the residual Mercury, and quickly mixed with four hundred parts of boiling water containing seven parts of Muriate of Soda in solution. Let the powder which falls down be washed with warm water,

so long as the decanted liquor on addition of some drops of water of Caustic Potash, shall form any deposit ; lastly, let it be dried.

REMARKS.—This is another mode of obtaining Calomel, first proposed by Scheele. This process being in the humid way, to many operators may be more convenient than the former. According to the method here directed, aqueous solutions of protonitrate of Mercury and Muriate of Soda, each at a boiling temperature, are mixed ; an exchange of principles takes place, Nitrate of Soda is formed, which remains in solution and protomuriate of Mercury, which being insoluble in water, separates and falls down : this when dried becomes Chloride of Mercury or Calomel. According to modern theory, when formed from aqueous solutions, this, until it is rendered dry, is a compound of protoxide of Mercury united to Muriatic Acid. Therefore the process should be so managed as that the Mercury shall combine with one atom only of oxygen ; for if peroxide of Mercury is formed, it will combine with two atoms of Muriatic Acid, and, when dried, produce the Chloride of Mercury, the Corrosive Muriate of Mercury of this Pharmacopœia. Still further, the Pernitrate of Mercury, if any should be formed, is decomposed by water, and a salt with excess of Peroxide of Mercury, a Dipernitrate of Mercury is precipitated. This becomes mixed with the Calomel. Now, the Mercury may be converted into a peroxide, either by the use of a large quantity of Nitric Acid heated on the Mercury, or by the mere excess of the Nitric Acid, which decomposing some of the sea salt, will, with the Muriatic Acid, form Nitromuriatic Acid capable of producing Corrosive Muriate or Bichloride of Mercury. To prevent this formation of Corrosive Muriate of Mercury, recourse is had to either of the following methods. 1. To dissolve the Mercury

in Nitric Acid sufficiently diluted with water, and carefully to obviate the extrication of heat, by immersing the vessel containing the mixture in cold water, or otherwise refrigerating it; employing more Mercury than the Acid can take up: or, 2. using a diluted acid, and much more Mercury than the Acid can dissolve; to digest the Acid on the Mercury, with the aid of heat, for some time after all action has apparently ceased. By the first of these methods the Mercury dissolves in the Acid, and does not pass to the state of peroxide; but an excess of Nitric Acid remains, which, as above-mentioned, produces Corrosive Muriate of Mercury. By the second method, any Peroxide of Mercury formed by the heated Nitric Acid and Mercury, is converted by the remaining Mercury into protoxide; the oxygen requisite for the conversion of the metal into an oxide, being supplied by the peroxide, as was first observed by Fourcroy. By these means the liquor also becomes fully charged with Oxide of Mercury, and the inconvenience arising from an excess of Nitric Acid in the liquor is to a certain degree remedied. The Dublin College has given the preference to the latter mode of obtaining a Nitrous solution of Mercury. That it is not perfectly efficacious, is proved by the process adopted for obtaining Ammoniated Submuriate of Mercury.

The following is a theoretical view of the steps of this operation which contains two processes.

PROCESS FIRST.

Materials.

3 Mercury,	= 600	4 Nitric Acid,	-	= 216
		39 Water,	-	= 351
				<hr/>
		Diluted Nitric Acid,		= 567

Products.

3 Mercury,	= 600	1 Nitrogen,	= 14
3 Oxygen,	= 24	2 Oxygen,	= 16
3 Nitric Acid,	= 162		—
	—	1 Nitric Oxide Gas,	= 30
3 Protonitrate of Mercury	= 786	39 Water	= 351
		Total,	= 381

PROCESS SECOND.

Materials.

1 Protoxide of Mercury,	= 208	1 Soda,	= 32
1 Nitric Acid,	= 54	1 Muriatic Acid	= 37
	—		—
1 Protonitrate of Mercury,	= 262	1 Muriate of Soda,	= 69

Products.

1 Protoxide of Mercury,	= 208	1 Nitric Acid,	= 54
1 Muriatic Acid,	= 37	1 Soda,	= 32
	—		—
1 Protomuriate of Mercury,	= 245	1 Nitrate of Soda,	= 86

To simplify the view given in the preceding scheme, the water in which the Nitrate of Mercury and Muriate of Soda are respectively dissolved, is omitted; those materials alone being introduced which undergo decomposition. The protomuriate of Mercury when dried becomes a chloride of the metal, or Calomel; the oxygen of the oxide and hydrogen of the acid uniting to constitute water and passing off, the Chlorine remaining in combination with the Mercury and forming the same compound as that produced by sublimation.

PROPERTIES, AND TESTS OF ITS PURITY.—Nearly the same as those of the preceding preparation, or sublimed Calomel. It is often suspected to contain Dipernitrate of Mercury: this may be detected by heating the Calomel in Nitric Acid diluted with twice its weight of water in which the Dipernitrate will dissolve, and from which the peroxide may be separated by addition of water of Caustic Potash, in form of a yellowish red powder. The presence of adhering Corrosive Muriate of Mercury may be detected by washing the Calomel with water or Alcohol, and examining the washings by water of Caustic Potash.

USES.—*Pharmaceutical and Medicinal.* The same as those of Sublimed Calomel. It is said to be more apt to act as a purgative than Calomel obtained by sublimation; this may arise from the presence of a small quantity of Dipernitrate.

For its DOSE see sublimed Calomel.

AMMONIATED SUBMURIATE OF MERCURY.

Add to the liquor poured off from precipitated Calomel as much water of Caustic Ammonia as may be sufficient completely to throw down the metallic salt; which is to be washed with cold water and dried on bibulous paper.

REMARKS.—This is long known as a triple salt consisting of Oxide of Mercury and Ammonia united to Muriatic Acid, and it has been formed either, 1. by adding water of Ammonia to a solution of Corrosive Muriate of Mercury in water, the Ammoniated Submuriate of Mercury being thrown down; or 2. by uniting Corrosive Muriate of Mercury with Muriate of Ammonia, the compound producing a salt much more soluble

in water than the Corrosive Muriate of Mercury; a salt long known by the name of Sal Alembroth; and when to an aqueous solution of the latter salt, water of Caustic Potash is added, ammoniated Submuriate of Mercury is immediately formed. Mr. Hennel has lately proved by experiment, that this salt is composed of one atom of Peroxide of Mercury united to one atom of Muriate of Ammonia. For, when an atom of Corrosive Muriate of Mercury dissolved in water is decomposed by two atoms of Ammonia, a compound consisting of Muriatic Acid, Peroxide of Mercury, and of Ammonia, of each one atom, is formed, and separates from the liquor; and an atom of Muriate of Ammonia remains in solution. The decomposition in this case may be thus represented:

Materials.

1 Peroxide of Mercury,	-	= 216	2 Ammonia,	= 34
2 Muriatic Acid,	-	= 74		
<hr/>				
1 Corrosive Muriate of Mercury,		= 290		

Products.

1 Peroxide of Mercury,	= 216	1 Muriatic Acid,	= 37
1 Ammonia, -	= 17	1 Ammonia,	= 17
1 Muriatic Acid, -	= 37		
<hr/>			
1 Ammoniated Submu- riate of Mercury,	} = 270	1 Muriate of Am- monia,	} = 54

It is already remarked that Corrosive Muriate of Mercury is formed in the liquor from which precipitated Calomel is obtained. The process here given turns this to advantage by causing the liquor to furnish the present preparation.

PROPERTIES, AND TESTS OF ITS PURITY.--Its colour is white. Taste, somewhat metallic. Exposed to heat it is resolved into Ammonia, Azotic Gas, Water and Sublimed Calomel. It dissolves in about 100 times its

weight of water; it is said to dissolve more abundantly in water of Ammonia.* It is insoluble in Alcohol. It does not become black from application of the caustic fixed alkalies or alkaline earths, but acquires a yellow colour, and Ammonia is disengaged. By fresh prepared Muriate of Tin it is decomposed, and Metallic Mercury evolved. Ammoniated Submuriate of Mercury was formerly prepared by a process different from that given in this Pharmacopœia; by uniting Muriate of Ammonia and Corrosive Sublimate, in quantities bearing to each other the proportion of their respective atoms. In this case, a salt is formed much more soluble in water than either of its constituents, and when to a solution of this salt in water, a quantity of water of Caustic Alkali sufficient to abstract two atoms of Muriatic Acid is added, Ammoniated Submuriate of Mercury is thrown down. The process here directed is more economical, for the reasons above given.

USES—*Pharmaceutical*. It is the principal ingredient of the ointment of Ammoniated Submuriate of Mercury.

DOSE.—It was formerly given in doses of from one to three grains, but it is no longer used as an internal remedy.

ACETATE OF MERCURY.

Take of Purified Mercury,
Acetate of Potash, of each nine parts,
Diluted Nitric Acid, eleven parts,
Boiling distilled Water, one hundred parts,
Distilled Vinegar as much as may be sufficient.

Let the Nitric Acid be added to the Mercury, and when the effervescence has ceased, let the mixture be digested that the metal may be dissolved: let the Acetate

* I could not detect it in water of Ammonia boiled on it.

of Potash be dissolved in water, and let the distilled vinegar be added until the acid shall predominate in the liquor; to this, whilst boiling, let the solution of the Mercury in the Nitric Acid be added, and let the mixture be filtered as quickly as possible through a double linen cloth; let it cool that crystals may form; having washed these with cold distilled water, dry them on paper with a very gentle heat. In every step of this process let glass vessels be employed.

REMARKS.—The object of this process is to unite Protoxide of Mercury with Acetic Acid. This is done by preparing a protonitrate of Mercury, and by mixing this with Acetate of Potash dissolved in hot water; a double exchange of principles taking place; Nitrate of Potash and Acetate of Mercury are formed. The first of these salts remains in solution; the last having little solubility in cold water, separates from the liquor on its cooling, and by washing may be obtained pure.

In this process there are two steps, 1. The solution of the Mercury in diluted Nitric Acid, by which Protonitrate of Mercury is formed. 2. The decomposition of the Protonitrate of Mercury by Acetate of Potash. For an explanation of the transfer of principles which takes place when Mercury is dissolved in Nitric Acid, see the scheme given at page 271. The decomposition of the Protonitrate of Mercury by Acetate of Potash and the relative quantities of the different principles transferred, are given in the following scheme.

Materials.

1 Protoxide of Mercury	= 208	1 Potash,	= 48
1 Nitric Acid,	= 54	1 Acetic Acid,	= 50
10 Water,	= 90	94 Water,	= 846
<hr/>			
1 Dissolved Protoni- trate of Mercury,	} = 352	1 Dissolved Acetate of Potash,	} = 944

Products.

1 Protoxide of Mercury,	= 208	1 Potash,	= 48
1 Acetic Acid,	= 50	1 Nitric Acid,	= 54
4 Water,	= 36	100 Water	= 900
<hr/>			
1 Crystallized Acetate of Mercury,	} = 294	1 Dissolved Nitrate of Potash	} = 1002

In this process the water is an essential ingredient, as the separation of the Nitrate of Potash and Acetate of Mercury from each other is effected by the difference of their solubility in cold water; the Nitrate of Potash having a moderate degree of solubility, but the Acetate of Mercury requiring a large quantity of water for its solution. Accordingly, the Acetate of Mercury crystallizes as the liquor cools, and by filtration may be obtained separate from the Nitrate of Potash which remains in solution. It is directed that whilst hot the mixture shall be filtered through a linen cloth; the object of this direction is, that if by the action of the water on the nitrous solution of Mercury, any Dipernitrate of Mercury should be precipitated, this should be retained on the filter; and its separation from the Acetate of Mercury is effected by this rapid mode of filtration, as the Dipernitrate of Mercury is precipitated in the hot liquor, but the Acetate of Mercury does not make its appearance in crystals until the liquor has somewhat cooled; consequently, the Mercurial salt passes through the filter in solution.

Acetate of Potash as generally prepared often contains an excess of Alkali, which acting on the nitrous solution of Mercury, also causes the separation either of an oxide or of Dipernitrate of Mercury, in form of a yellow powder, which would be retained on a linen filter, and thus prevented from contaminating the product; but as a

loss would be thereby occasioned, distilled Vinegar is added to the Acetate of Potash until the acid predominates. This addition the writer found completely to prevent the formation of any deposit except that of Acetate of Mercury. The crystals of Acetate of Mercury obtained by this process, should be washed with cold water, as they are very soluble in hot water. They are also very easily liquefied by heat, for which reason, in the process of drying, the heat applied should little exceed the mean atmospheric temperature. The use of glass vessels is directed, as the excess of acid which is present in the liquors, might act on metallic vessels, and by introducing a metallic solution, contaminate the product. To form Acetate of Mercury, the metal must be present in the state of Protoxide, for, according to the writer's experience, a solution of Peroxide of Mercury in diluted Nitric Acid, when mixed with Acetate of Potash, will not deposit Acetate of Mercury. It is therefore evident that the directions already given for preparing a Protonitrate of Mercury should be observed. Acetate of Mercury might also be prepared by dissolving protoxide of Mercury, or black oxide of Mercury of this Pharmacopœia, in hot Acetic Acid, and suffering the solution to cool; but the preparation would be more expensive than that here directed.

PROPERTIES, AND TESTS OF ITS PURITY.—It has the form of thin flexible plates of a silvery lustre, bearing some resemblance to those of Boracic Acid. Exposed to air it is unchanged, but its colour is altered by light, and it acquires a brown tinge; for this reason Acetate of Mercury should be kept in vessels impervious to the light. In hot water it readily dissolves, but requires about 600 times its weight of cold water for solution. See Thomson's First Principles, vol. ii. p. 400. The alkalies and alkaline earths change its colour to black, by separating from it protoxide of Mercury. Muriate of

Soda throws down from its solution an abundant white precipitate. When mixed with Sulphuric Acid, strong or moderately diluted and exposed to heat, Acetic Acid is disengaged, which may be collected in a suitable apparatus.

USES.—*Medicinal.* It may be used in all cases to which a mild and soluble preparation of Mercury is applicable. It is the active ingredient of a quack medicine sold under the name of Keyser's Pill, which, it is said, may be composed by mixing together equal parts of Starch, Gum Tragacanth, and Acetate of Mercury. A solution of one grain of Acetate of Mercury in an ounce of Water is used in some cutaneous diseases. See Dr. A. T. Thomson's Dispensatory, p. 672. An ointment has also been prepared with this salt by dissolving two or three scruples of it in an ounce of olive oil. This is said to be useful in certain eruptive diseases.

DOSE.—From one to five grains.

CYANURET OF MERCURY.

Take of Cyanuret of Iron, six parts,
Nitric Oxide of Mercury, five parts,
Distilled Water, forty parts.

Let the Cyanuret of Iron and Oxide of Mercury be mixed, and then added to the water previously warmed. Boil the mixture with continual stirring during half an hour, and filter through bibulous paper. Let the residue be frequently washed with warm distilled water. Lastly, let the filtered liquors evaporate, and by their cooling let crystals form.

REMARKS.—This preparation is directed, because Cyanuret of Mercury is prescribed in the form for Prussic

acid given at page 57. According to present views, adopted from those of M. G. Lussac, its discoverer, Cyanuret of Mercury is composed of Mercury and a peculiar compound of Carbon and Nitrogen, to which, from its forming an acid having the property of producing a blue compound with Oxide of Iron, the name of Cyanogen has been given. Cyanogen is composed of

$$\begin{array}{rcl}
 2 \text{ Carbon,} & = & 12 \\
 1 \text{ Nitrogen,} & = & 14 \\
 \hline
 1 \text{ Cyanogen,} & = & 26
 \end{array}$$

M. G. Lussac, its discoverer, determined its composition by deflagrating a mixture of one part in volume of this gas with two parts in volume of Oxygen Gas, when two parts in volume of Carbonic Acid Gas were formed, and one part in volume of Nitrogen Gas remained; Cyanogen is therefore composed of two parts in volume of Carbon in vapour united to one volume of Nitrogen, the compound being condensed into the space of one volume. This compound, by union with Hydrogen, produces the Hydrocyanic or Prussic Acid, composed of

$$\begin{array}{rcl}
 2 \text{ Carbon,} & = & 12 \\
 1 \text{ Nitrogen,} & = & 14 \\
 1 \text{ Hydrogen,} & = & 1 \\
 \hline
 1 \text{ Prussic Acid,} & = & 27
 \end{array}$$

The composition of this acid was also ascertained by G. Lussac by deflagrating it with Oxygen Gas. Two parts in volume of its vapour producing two parts in volume of Carbonic Acid Gas; a diminution taking place on deflagration, indicating the presence of one part in volume of Hydrogen Gas; one part in volume of Nitrogen Gas remaining. Prussic Acid is therefore composed of

two parts in volume of Carbon in vapour, united to one part in volume of Nitrogen, and one part in volume of Hydrogen; the whole being condensed into the space of two volumes, or one half the sum of the volumes of the preceding gases taken separately.

The acid which exists in Prussian blue, namely Ferro-prussic Acid, is composed of

1 Hydrocyanic or Prussic Acid,	=	54
1 Cyanuret of Iron,	=	54
		<hr/>
1 Ferro-prussic Acid,	=	108

and this, united to peroxide of Iron, constitutes the Ferro-prussiate of Iron, or the colouring part of Prussian blue, consisting of

1 Ferro-prussic Acid,	=	108
2 Peroxide of Iron,	=	80
		<hr/>
1 Ferro-prussiate of Iron,	=	188

Conformably with these views, the decomposition of Ferro-prussiate of Iron by Peroxide of Mercury, and the formation of Cyanuret or Bicyanide of Mercury, may be theoretically represented as follows:

Materials.

4 Carbon,	=24	} = 2 Hydrocyanic Acid, = 54	1 Peroxide of Mercury, }	= 216
2 Nitrogen,	=28			
2 Hydrogen,	= 2			
2 Carbon,	=12	} = 1 Cyanuret of Iron, = 54		
1 Nitrogen,	=14			
1 Iron, -	=28			
<hr/>				
1 Ferro-prussic Acid, -	-	-		= 108
2 Peroxide of Iron, -	-	-		= 80
<hr/>				
1 Ferro-prussiate of Iron, -	-	-		= 188

Products.

4 Carbon, =24	} =2 Cya- nogen, }	=52	2 Hydrogen, = 2	} =2 Water, = 18			
2 Nitrogen, =28			2 Oxygen, =16				
1 Mercury, - - -	=200		2 Carbon, =12	} =Cyanuret of Iron, }			
1 Cyanuret or Bicyanide of Mercury,	=252		1 Nitrogen, =14				
			1 Iron, =28				
			2 Peroxide of Iron, - - -	= 80			
			Total residue, - - -	=152			

The ordinary Prussian blue of commerce, which is directed in this Pharmacopœia, always contains an admixture of Alumine, intentionally introduced in the course of its preparation ; it also either contains variable quantities of water, or it is a hydrate from which the water is scarcely separable ; and for these reasons, it is difficult exactly to adjust the quantity of this compound to that of the Peroxide of Mercury, so as to produce complete decomposition. For this purpose the Peroxide of Mercury should be added until the blue colour of the Ferro-prussiate of Iron has disappeared. The solution of the Cyanuret or Bicyanide of Mercury should also be boiled on some pulverized Peroxide of Mercury for the purpose of detaching any adhering Ferro-prussiate of Iron. The latter object is also obtained by using an excess of Peroxide of Mercury for decomposition of the Prussian blue.

PROPERTIES, AND TESTS OF ITS PURITY. The colour of Cyanuret of Mercury, is white. It crystallizes in the form of four sided prisms obliquely truncated. It suffers no change from exposure to the air. In its dry state, when exposed to heat, it affords the gas named Cyanogen. Cyanuret of Mercury is very soluble in water. Its solution is not decomposed by the caustic fixed alkalies, but it affords an abundant deposit of black Sulphuret of Mercury on the addition of Sulphuretted Hydrogen ; and the

filtered liquor, when purified from Sulphuretted Hydrogen by agitation with Carbonate of Lead, contains Prussic Acid. It is also decomposed by the Hydrosulphurets, and a black Sulphuret of Mercury is thrown down. When subjected to distillation with liquid Muriatic Acid, as in the form given in this Pharmacopœia, it affords Prussic Acid in the liquid state, and Corrosive Muriate or Bichloride of Mercury remains in the retort and crystallizes on cooling of the liquor. The solution of the Cyanuret of Mercury yields, with Nitrate of Silver, a white crystallized precipitate.

USES.—*Pharmaceutical.* It is applied only in the preparation of the Hydrocyanic Acid, the Prussic Acid of this Pharmacopœia.

ACETATE OF LEAD.

Take of the Carbonate of Lead named *Ceruse*, any required quantity,

Distilled Vinegar, ten times the weight of the Carbonate of Lead.

Digest in a glass vessel, until the vinegar becomes sweet ; having poured this off, add more vinegar until it ceases to acquire a sweet taste. Filter the liquor, and by slow alternate evaporation and refrigeration let crystals be formed, which are to be dried in the shade.

REMARKS.—The object of this process is to obtain crystallized Acetate of Lead, which is effected by uniting distilled Vinegar to the Protoxide of Lead contained in *Ceruse* or White Lead of commerce. The latter substance is procured by exposing thin leaden plates to the joint action of atmospheric air and the vapours of Vinegar ; and the Carbonate of Lead, which is the product of this ope-

ration, when dissolved in diluted acetic Acid, on evaporation and cooling, affords crystals of Acetate of Lead. In this process, a pure Vinegar should be used, as the salt obtained will otherwise be coloured. The crystals are directed to be dried in the shade, as exposure to solar light is supposed to injure their colour. For the preparation of Acetate of Lead, Carbonate of Lead is directed in all the Pharmacopœias of these countries, but in the French Codex, Litharge is prescribed, which with proper management serves the purpose equally well.

Acetate of Lead has a sweet taste, hence the reason for the direction given that the Vinegar shall be added so long as it continues to become sweet. A slight excess of acid should be employed, as this insures the absence of any Diacetate of Lead.

This salt is prepared in the large way, by partially immersing in Vinegar thin sheets of Lead, so disposed that they shall be half covered by the acid. The metallic surface, exposed to the joint action of the acid and the atmosphere, becomes encrusted with Carbonate of Lead, which, by inverting the plates is dissolved in the acid; the part which had been immersed acquiring an incrustation of Carbonate of Lead: thus, by the alternate immersion of each extremity of the plate, the acid gradually becomes saturated with Oxide of Lead; which is known by the milky appearance of the liquor. By evaporation and cooling, a mass of crystals is obtained, in commerce termed Sugar of Lead. The Carbonate of Lead or Ceruse directed in this preparation, is sometimes adulterated with Carbonate of Lime, which may be detected by making a solution of the substance in Acetic Acid, and separating the Lead by means of a current of Sulphuretted Hydrogen Gas; the liquor heated to ebullition and filtered will have lost its sweet taste, and if lime is present, will yield with the fixed alkalies a white precipitate, insoluble in an excess of the alkali; it will also afford a

white precipitate with the Alkaline Carbonates and Oxalate of Ammonia.

The changes which take place, and the relative quantities of the combining principles, are thus represented:

Materials.

1 Acetic Acid,	-	= 50	1 Protoxide of Lead,	= 112
3 Water,	-	= 27	1 Carbonic Acid,	= 22
		<hr/>		
1 Diluted Acetic Acid,		= 77	1 Carbonate of Lead,	= 134

Products.

1 Acetic Acid,	-	= 50	1 Carbonic Acid Gas,	= 22
1 Protoxide of Lead,		= 112		
3 Water,	-	= 27		
		<hr/>		
1 Crystallized Acetate	}	= 189		
of Lead,				

PROPERTIES, AND TESTS OF ITS PURITY. Its colour is white. Its crystals have the form of flattened quadrangular prisms with dihedral summits. The primitive form is a right oblique angled prism. The Salt of commerce, or Sugar of Lead, occurs in masses composed of minute needle shaped crystals. Its taste is sweet and astringent. From exposure to air it undergoes little change ; in a dry atmosphere it is in a slight degree efflorescent. It dissolves in about four times its weight of cold water. It is also soluble in Alcohol. Its solution is decomposed by exposure to the atmosphere, and Carbonate of Lead is formed which renders the liquor turbid. Mr. Brande informs us that by Carbonic Acid one half of the Oxide of Lead is thrown down, and that a Binacetate of Lead remains. Acetate of Lead is also decomposed by an aqueous solution of any Car-

bonate or Sulphate ; for this reason it forms a white turbid compound with most kinds of spring or pump water. The Sulphuric and Muriatic Acids, either free or combined, decompose its solution if sufficiently concentrated. Sulphuretted Hydrogen immediately detaches from it the Lead in the form of a Sulphuret. The addition of Chromate or Bichromate of Potash dissolved in water, immediately causes the deposition of a yellow or orange coloured Chromate or Bichromate of Lead.

USES.—*Pharmaceutical.* It is used in the preparation of the Ointment of Acetate of Lead.

—*Medicinal.* Taken internally, Acetate of Lead acts as a sedative astringent ; it is sometimes given in cases of hemorrhage from the lungs, and is much used in France for this purpose. In dysentery also it has been frequently prescribed, but the writer has often tried it in the advanced stages of this disease, with but little benefit : in these cases it is generally given combined with Opium. It is said to have been employed successfully in the treatment of epilepsy.

Although Acetate of Lead is poisonous when its use has been long continued, yet some peculiarity of constitution or unknown external circumstance is required to give it activity, for, large quantities have been accidentally swallowed without any bad effect. That it is poisonous, the production of saturnine colic from the use of wines containing salts of lead abundantly proves. Its poisonous nature is also established by experiments on lower animals. Orfila asserts, that dogs on whom its action in the solid form was tried, die in consequence of the corrosion it produces in the digestive canal, and that when taken in the liquid form, having remained in the stomach a time sufficient for absorption, its fatal effects depend more upon its action on the nervous system than on the inflammation it occasions.

Acetate of Lead is a useful external application; made into a poultice with crumb of bread, its aqueous solution is often applied to moderate inflammatory action. It is also frequently used as a collyrium. The decomposition which takes place in its solution in consequence of the absorption of Carbonic Acid from the atmosphere, may be prevented by the addition of a quantity of distilled Vinegar sufficient to produce a slight excess of acid in the liquor.

DOSE.—From half a grain to two grains.

LIQUOR OF SUBACETATE OF LEAD.

Take of the Semivitreous Oxide of Lead, one part,
Distilled Vinegar, twelve parts.

Let the mixture be boiled down in a glass vessel, until eleven parts of the fluid remain, then let the liquor rest, and when the impurities have subsided let it be filtered.

REMARKS.—The materials of this process are distilled Vinegar, directed on account of its purity; and Litharge, the Semivitrified Oxide of Lead; a product of the operation by which Silver is separated from the Ore of Lead. The acid and oxide are united by boiling the acid on the oxide; and as an excess of the latter is used, and the boiling continued for some time, a quantity of oxide is taken up double of that contained in the former preparation, or a Diacetate of Lead is formed, as was first observed by M. Thenard. See Nicholson's Journal, v. 6. p. 223. A similar preparation might be made by boiling a solution of Acetate of Lead on pulverized Litharge. Dr. Thomson represents this as a Triacetate of Lead, or containing

three atoms of the Oxide of Lead. In its crystallized form, according to Thenard's analysis, it consists of

1 Acetic Acid	-	-	-	=	50
2 Protoxide of Lead,	-	-	-	=	224
1 Water,	-	-	-	=	9
<hr/>					
1 Crystallized Diacetate of Lead,				=	283

The proportion of Litharge to distilled Vinegar for this preparation, was adjusted by the writer; by taking a certain quantity of distilled Vinegar, passing it into a retort and gradually adding pulverized Litharge, until the latter ceased to dissolve in the boiling acid, and the liquor which passed over in distillation was perfectly free from acid. This was found to take place when the Litharge amounted in weight to 1-12th of the Vinegar. The solution thus obtained had the specific gravity of 1118, at temperature 68°; and it faintly reddened both Litmus and Turmeric Paper. The Litharge used for this preparation should be reduced to a fine powder.

PROPERTIES, AND TESTS OF ITS PURITY.—The liquor obtained by this process, is colourless and transparent. When sufficiently evaporated and let to cool, it deposits crystals having the form of flat rhomboidal prisms, with dihedral summits. This solution is decomposed more abundantly than that of Acetate of Lead by Carbonic Acid. It affords a copious precipitate with mucilage or gum dissolved in water; an effect which is not produced by the latter agent on a solution of Acetate of Lead in water. The fixed Alkalies, Alkaline Carbonates and Sulphates, and Sulphuric and Muriatic Acids either free or combined, produce the same changes in this solution as in that of Acetate or other salts of lead. Sulphuretted Hydrogen and the Hydrosulphurets form a black precipitate of Sulphuret of Lead: and Chromate, or

Bichromate of Potash, a yellow precipitate, as in other solutions containing this metal. When mixed with strong Sulphuric Acid in a retort, and exposed to heat, diluted Acetic Acid comes over. The solution of Subacetate of Lead strongly attracts vegetable colouring matters, and forms with them an insoluble compound.

The liquor of Subacetate of Lead here prescribed, is similar to one long known by the name of Goulard's extract of lead, because it was first recommended for medical use by Goulard, a Surgeon at Montpellier; it was a stronger preparation than that above directed, because it was made with common Vinegar; but from the vegetable impurities which Vinegar contains, the preparation had a brown colour.

USES—*Pharmaceutical*. For preparing the Compound Liquor of Subacetate of Lead.

—*Medicinal*. Diluted with water, it is applied to the same purposes as the Acetate of Lead, and it probably has more astringency.

COMPOUND LIQUOR OF SUBACETATE OF LEAD.

Take of the liquor of Subacetate of Lead, a drachm,
Distilled Water, a pint,
Proof Spirit, a drachm.

Mix.

REMARKS.—This is a very diluted solution of Subacetate or Diacetate of Lead, intended to supply the place of the vegeto mineral water of Goulard. The spirit was probably added to prevent decomposition of the vegetable acid.

PROPERTIES, AND TESTS OF ITS PURITY.—It should

be transparent and colourless: when prepared with water containing Carbonic Acid, or any Carbonate or Sulphate, it acquires a white tinge from the production of Carbonate or Sulphate of Lead. When examined with the tests given under the head of Acetate of Lead, it should afford the indications there specified.

When any of the above preparations of lead have been swallowed in such quantity as to exert a poisonous irritating action on the digestive canal, the Sulphate of Magnesia or of Soda is the proper antidote; which by converting the Acetate into Sulphate of Lead, renders it inert. If inflammation has taken place, blood-letting fomentations and blisters should be had recourse to.

USES.—*Medicinal.* It is much used as an application to bruised or inflamed parts, also as a collyrium, and sometimes as an injection into the urethra.

POWDER OF TIN.

Take of the purest Tin, any required quantity.

Liquefied by heat, let it be strongly agitated until it passes into a powder, which when cold is to be shaken through a sieve.

REMARKS.—By this process Tin is obtained in a state of minute division. It is a very fusible metal, and when liquefied by heat it is strongly agitated, either by shaking it in a wooden box rubbed on the inside with chalk, or by stirring it with a rod or a broom, it becomes granulated, and the finer may be separated from the coarser particles, by means of a sieve. The purest tin is here directed: the kind known in commerce by the

name of Grain Tin, being the most fusible part of the product obtained from the ore, and which first flows off in the process of smelting, should be preferred.

PROPERTIES, AND TESTS OF ITS PURITY.—The colour of pure tin is a brilliant white. It is soft and flexible. Its specific gravity is 7.29. Tin fuses at temperature 442° , and when in sufficiently large quantity, on cooling it crystallizes in rhomboidal prisms. A globule of the size of a small pea, exposed on charcoal to the extreme flame of the blow pipe, immediately fuses and becomes encrusted with a grey coloured oxide. Heated in strong Muriatic Acid, it dissolves with effervescence, from extrication of Hydrogen Gas. This solution, when fresh prepared, decomposes a solution of the Muriate of Gold, throwing down from it a purple powder. In a solution of corrosive sublimate, it forms a precipitate, at first of a white colour but soon becoming grey. Tin also dissolves in the Nitric Acid diluted with two or three times its weight of water; the liquor when heated grows turbid, and the greater part of the Tin is precipitated in form of an oxide. If the tin contains arsenic, its solution in Muriatic Acid will deposit a powder of a reddish brown colour, of which the quantity will increase as the solution advances; the presence of Arsenic in the deposit may be determined by washing it with water, drying, and exposing it to heat with charcoal, when Arsenic, if present, will rise with the smell of garlic, and may be condensed in a proper apparatus. If lead was present in the tin, Sulphate of Soda added to the washings, will cause a turbidness; Copper in the liquor is detected by the blue tinge which ammonia occasions, and Oxide of Iron, if present, will then be precipitated.

USES—*Medicinal*. Tin powder is used only as a vermifuge, and for the expulsion of a peculiar species of worm chiefly, the *Ascaris lumbricoides*, which, in general appearance, resembles the common earthworm. It is

more rarely used in Tænia. Its use as a medicine has been represented as dangerous, but the numerous instances which occur to physicians, several of which have been witnessed by the writer, of the internal use of Tin unattended by any bad consequences, prove it to be a safe remedy. The experiments of Bayen demonstrated that when Arsenic formed 1-17th part of an alloy of this metal with Tin, that the compound was innocuous.] See *Opuscules Chimiques*, T. 2. p. 411. He also showed that English Tin does not contain, on an average, more than $\frac{1}{8\frac{1}{2}}$ part of Arsenic. The experiments of Vauquelin, *Annales de Chimie*, T. 32. p. 343, proved that vegetable acids have little or no action on the Lead contained in an alloy of Tin with a small quantity of Lead. These experiments were confirmed by those of Proust, *Annales de Chimie*, T. 51. p. 140. If the Tin powder be much oxidated it should not be used as an internal remedy. Other vermifuge remedies, particularly Oil of Turpentine, are now generally preferred.

IMPURE PREPARED CARBONATE OF ZINC.

Let impure roasted Carbonate of Zinc be reduced to powder, and let the finest particles be separated from it, by the mode directed for the preparation of Chalk.

REMARKS.—This is an impure Ore of Zinc, by mineralogists named Calamine, and in commerce Lapis Calaminaris. It consists principally of Oxide of Zinc united to Carbonic Acid, and its composition may be stated to be,

1 Oxide of Zinc,	-	=	42
1 Carbonic Acid,	-	=	22
			—
1 Carbonate of Zinc,		=	64

but as it occurs in commerce, it contains variable quantities of Carbonic Acid, principally in consequence of its having been exposed to heat. The Edinburgh College directs that it shall be obtained from the Brass manufacturers, for whose use it is first roasted, by which operation the water and part of the Carbonic Acid are expelled. As met with in commerce, it often contains some foreign oxides, and frequently a minute quantity of the Oxide of Cadmium. The process here directed, merely effects its reduction to a subtile powder, and fits it for use as an external application, or for the production of the ointment which it contributes to form.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is buff or reddish yellow. It is devoid of lustre and has an earthy appearance. In diluted Sulphuric or Nitric Acid it dissolves slowly, and with effervescence when Carbonic Acid is present; from these acids, Oxide of Zinc is thrown down by Ammonia, an excess of which completely dissolves the precipitate. Hydrosulphuret of Ammonia causes in the solution a white precipitate.

USES.—*Pharmaceutical.* It is applied to prepare the Ointment of Calamine of this Pharmacopœia, a preparation long known under the name of Turner's Cerate.

—*Medicinal.* It is sometimes sprinkled over sores, to absorb the fluids secreted from them, and to dry their surface.

It is a principal ingredient in the manufacture of Brass.

OXIDE OF ZINC.

Take of Zinc broken into small fragments, any required quantity.

Let portions of the metal be thrown at separate in-

tervals of time into a crucible heated to whiteness and of sufficient depth; its mouth inclining somewhat toward the door of the surface; and after the injection of each piece of Zinc, let another crucible be inverted over that which receives the metal, but loosely, that the air may not be excluded: let the sublimed light powder and the whitest part of it be preserved for use.

REMARKS.—Zinc, the metal used in this process, is of a white colour, and exhibits a lamellated fracture. It has little ductility or malleability at ordinary temperatures, but when heated somewhat above 212° it may be laminated and drawn into wires. In hardness it is equal to Copper. Its specific gravity is 6.861. When strongly heated, Zinc is converted into vapour, and in a proper vessel it may be distilled. If the temperature be raised so much as to volatilize the metal, and the atmosphere have free access, it burns with a brilliant white flame tinged with green and blue, the combustion being produced by the union of the metal with oxygen. Part of the oxide thus formed remains within the crucible; it is mixed with metallic Zinc and foreign oxides, and is similar to the impure Oxide of Zinc which is obtained in the smelting processes under the name of Tutia or Tutty, and with which an ointment was prepared in former Pharmacopœias. Another part of the oxide being formed by the metal volatilized into the atmosphere, floats about in white flocks, which from their extreme levity were named Nihil Album.

In preparing this Oxide, the Zinc should be passed into the crucible by small quantities at a time, to insure its exposure to the air and complete combustion; for if the whole mass were at once put into the crucible, the Oxide formed on the surface would exclude the atmosphere from the inferior portions of the metal, which would consequently remain unchanged. The requisite exposure of the Zinc to the air, is also obtained by re-

moving with an Iron ladle the Oxide of Zinc, as it forms on the surface; according to the direction given in the form of the Edinburgh College. As the Zinc is converted into vapour, and in this state becomes an oxide, a portion of the product would be lost if the crucible were not placed in an inclined position, and covered with another crucible to act as a receiver: in this case, the crucibles should not fit closely to each other, as the access of air and oxidation would thereby be prevented. The lightest part of the powder and of the whitest colour is directed to be preserved for use, as this portion contains Oxide of Zinc most free from metallic Zinc or foreign oxides.

The London College directs Oxide of Zinc to be prepared by decomposing a solution of Sulphate of Zinc by Ammonia; but the preparation does not appear to have any advantage over that here prescribed.

PROPERTIES, AND TESTS OF ITS PURITY.—Its colour is white. It dissolves completely and without effervescence in diluted Sulphuric or Nitric Acid, and affords, with the alkalies, Hydrosulphuret of Ammonia and Ferroproussiate of Potash, a white precipitate: that which is yielded by the alkalies is soluble in an excess of the alkali.

USES.—*Pharmaceutical.* Used only in preparing the ointment of Oxide of Zinc.

—*Medicinal.* Given internally it operates as a tonic astringent, and has been deemed useful in epilepsy, chorea and hooping cough. In its unmixed state it is sometimes applied externally to promote the drying of excoriated and exuding surfaces, and with the same intention it is frequently used in form of an ointment.

TINCTURE OF ACETATE OF ZINC.

Take of Sulphate of Zinc,
Acetate of Potash, of each one part,

Triturate them together, and add of rectified spirit sixteen parts, macerate during a week with occasional agitation, and filter through paper.

REMARKS.—The intention of this process is to obtain a solution of Acetate of Zinc in diluted Alcohol. For this purpose, Sulphate of Zinc and Acetate of Potash are mixed; the latter dissolves in the spirit, and acting on the Sulphate of Zinc, an exchange of principles takes place, and Sulphate of Potash and Acetate of Zinc are formed. Of these salts the first is insoluble in the spirit, but the second dissolves, and an alcoholic solution of the Acetate of Zinc is obtained.

The changes which take place in this instance, and the quantities of the different combining ingredients, are represented in the following scheme.

Materials.

1 Oxide of Zinc,	-	= 42	1 Acetic Acid,	-	= 50
1 Sulphuric Acid,	-	= 40	1 Potash,	-	= 48
7 Water,	-	= 63	2 Water,	-	= 18
<hr/>			<hr/>		
1 Sulphate of Zinc crys-	}	=145	1 Acetate of Potash	}	=116
tallized,			crystallized,		

Products.

1 Acetic Acid,	-	= 50	1 Potash,	-	= 48
1 Oxide of Zinc,	-	= 42	1 Sulphuric Acid,	-	= 40
7 Water,	-	= 63			<hr/>
		<hr/>	1 Sulphate of Potash,	-	= 88
1 Acetate of Zinc crys-	}	=155	2 Water disengaged,	-	= 18
tallized,				<hr/>	
				Total,	-	=106

s s

The alcohol, which acts an important part in dissolving the soluble ingredients of the compound, and rejecting those which are insoluble in rectified spirit is omitted in the preceding scheme ; its action may be explained by supposing that a solution of Acetate of Zinc is transferred to the spirit, in place of the Acetate of Potash.

PROPERTIES, AND TESTS OF ITS PURITY.—This solution is transparent and colourless. Evaporated to a moderate degree of dryness, it yields a salt which dissolves in water, and affords a white precipitate with Hydrosulphuret of Ammonia and with the Alkalies ; the precipitate produced by the latter is soluble in an excess of the alkali. From the same salt Acetic Acid is obtained by Sulphuric Acid aided by heat.

Acetate of Zinc can be made to crystallize by dissolving Zinc or its oxide in Vinegar or Acetic Acid, from which solution crystals may be obtained in the form of shining hexagonal and rhomboidal plates. Messrs. Aikin, in their Dictionary of Chemistry, V. 2, p. 505, inform us that “the specific gravity of a saturated solution of Acetate of Zinc, made by digesting the crystallized salt in distilled Vinegar, is 1055. One ounce by measure of the solution weighs 506 grains, and contains 29.8 grains of dry, or 46.5 grains of crystallized salt.” In the Edinburgh Pharmacopœia, a form is given for preparing an aqueous solution of Acetate of Zinc, by mixing a drachm of Sulphate of Zinc with four scruples of Acetate of Lead, each dissolved in ten ounces of water, and when the Sulphate of Lead has subsided, filtering the liquor which holds the Acetate of Zinc in solution : the quantities of the salts which are here directed, are very nearly those requisite for complete mutual decomposition. This preparation is obviously much weaker than that prescribed by the Dublin Pharmacopœia, and as it contains the salt dissolved in water, it must be much less stimulant than the alcoholic solution.

USES.—*Medicinal.* Much diluted with water it is employed as an astringent collyrium, or as an injection.

SULPHATE OF ZINC.

Take of Zinc in small fragments, thirteen parts,
Sulphuric Acid, twenty parts,
Water, one hundred and twenty parts.

On the Zinc passed into a glass vessel, gradually pour the acid previously diluted with water: when the effervescence has ceased, digest the mixture for some time, then let the filtered liquor evaporate, and after the requisite evaporation, set it aside that crystals may form.

REMARKS.—By this process, pure and crystallized Sulphate of Zinc is obtained. The attraction of Sulphuric Acid for Oxide of Zinc produces a decomposition of water; the Oxygen of this fluid, uniting with the Zinc, converts it into an Oxide, which is dissolved by the acid, and the other constituent of the water passes off in form of gaseous hydrogen, giving rise to a strong effervescence in the mixture. The salt thus formed is in commerce named white Vitriol.

Materials.

1 Sulphuric Acid, = 40	} = 1 Liquid Sulphuric Acid, }	= 49	1 Zinc, = 34
1 Water, - = 9			
7 Water, - - - - -			
		= 63	
<hr/>			
Diluted Sulphuric Acid, - - -		= 112	

Products.

1 Sulphuric Acid,	-	= 40	1 Hydrogen Gas, = 1
1 Zinc,	-	= 34	
1 Oxygen,	-	= 8	
7 Water,	-	= 63	
<hr/>			
1 Sulphate of Zinc crystallized,		=145	

The Dublin Pharmacopœia of 1807, directs three ounces of Zinc to five ounces of acid; but according to the statement above given, the quantity of acid employed appeared too great in proportion to the quantity of Zinc. An experiment was therefore made, to determine if the result of experience would correspond with theory. 189.25 grains of Sulphuric Acid, distilled and concentrated by boiling it for some time, were diluted with water in quantity amounting to six times the weight of the acid, and mixed with 126.7 grains of Zinc: the weights of the acid and metal bearing to each other the proportion of 49 to 32.8, as indicated by Dr. Wollaston's table of chemical equivalents. The mixture was boiled for an hour or more, on each of three successive days. A portion of the Zinc remained undissolved, amounting to 0.37 grains, and some foreign metals weighing 3.25 grains; the total quantity of Zinc dissolved was therefore $126.7 - 0.37 = 126.33$ grains, and the solution was neutral. Therefore, 49 parts of Sulphuric Acid, dissolve but 31.8 grains of Zinc, instead of 34, as stated in the above scheme. The numbers 20 and 13, assigned in the Dublin Pharmacopœia of 1826, to liquid Sulphuric Acid and Zinc respectively, represent in the lowest terms, as nearly as can be done by whole numbers, the quantities of acid and Zinc which should be employed, to avoid waste of either ingredient. It also follows, that the quantities of acid and metal prescribed by the London College give more nearly

the just proportion, than those prescribed either by the Edinburgh Pharmacopœia, or the Dublin Pharmacopœia of 1807.

Sulphate of Zinc is manufactured in the large way under the commercial name of white Vitriol. Ores containing a large proportion of Sulphuret of Zinc, the Blende of mineralogists, are exposed to the operation of roasting, by which Sulphate of Zinc is formed, the Zinc being changed into an oxide, and the Sulphur into Sulphuric Acid: the product is then washed, and the same portion of water being passed over different portions of ore in succession, becomes highly impregnated with Sulphate of Zinc. The solution is then evaporated in leaden pans, and by this process, together with exposure to air, the Oxide of Iron and other foreign oxides are in part removed, and the Sulphate of Zinc is made to crystallize. The salt is then transferred to copper boilers, in which it is made to undergo watery fusion, and the impurities are skimmed off from the surface. The fluid salt is then transferred to wooden troughs, and whilst cooling is continually stirred, by which it is converted into a mass, in texture and appearance resembling snow. The salt is then compressed into wooden boxes or conical shaped moulds, and dried in white loaves resembling those of sugar.

The white Vitriol so prepared is never pure, but contains the Oxides of Iron, Copper, and Manganese, and perhaps also of Cadmium. From these it may be in part detached, by dissolving the salt in water and heating it with metallic Zinc, by which the foreign metals are in a considerable degree separated; but the Sulphate of Zinc thus obtained is never so pure as that prepared by dissolving Zinc in diluted Sulphuric Acid, as directed in this Pharmacopœia. By the latter process Sulphate of Zinc is manufactured in England, and is therefore more pure

than the foreign white Vitriol, but it still contains a minute quantity of Sulphate of Iron.

PROPERTIES, AND TESTS OF ITS PURITY.—Sulphate of Zinc is nearly transparent, and colourless. It crystallizes in the form of prisms, generally with four, more rarely with six or eight sides, terminated by four-sided pyramids. It is but little altered by exposure to the air. Its taste is strongly metallic. When heated it undergoes watery fusion. It dissolves in 2.28 times its weight of cold water, and in much less water at 212° . When the salt is deprived of its water of crystallization it requires a much larger quantity of water to dissolve it. This solution is decomposed by the fixed Alkalies and Ammonia, and the Oxide of Zinc is separated, which is redissolved by an excess of the Alkali. It is also decomposed by the alkaline earths. Hydrosulphuret of any of the Alkalies throws down a white precipitate from a solution of Sulphate of Zinc. Sulphate of Baryta is thrown down from it in great abundance by Muriate, Nitrate, or Acetate of Baryta. If Sulphate of Zinc is pure, its solution does not yield Oxide of Iron, nor does it become blue on adding to it water of Ammonia; and the Ferro-prussiate of Potash separates from it a white precipitate only.

USES.—*Pharmaceutical.* In the preparation of the Tincture of Acetate of Zinc.

—*Medicinal.* In large doses it is given as an emetic, and from its property of operating rapidly and with much certainty, it is often used to evacuate the stomach when poison has been swallowed. In smaller doses it is given as a tonic or astringent, and with this intention is prescribed in some convulsive diseases, as epilepsy and chorea; it has also been used in dyspepsia. It is often applied as an external astringent to restrain hemorrhage, and sometimes as a collyrium, in which case a few drops of the Wine of Opium may be added to each ounce of

the solution. It is also employed as an injection in gonorrhœa, and in fluor albus. The solution is sometimes used as a wash for the mouth in apthæ or in ulceration of its mucous membrane.

DOSE.—As an emetic, from eight to twenty-four grains : as a tonic, from one to three grains ; in the latter case it may be dissolved in distilled or rose water. The solution to be used as an external application, may be prepared by dissolving one or two grains of Sulphate of Zinc in each ounce of water.

If the Crystals of Salts should appear contaminated by impurities, let them first be washed in the liquor from which they were obtained, and then in a little distilled water or rectified spirit. It often happens that after the first crystallization, by evaporation and cooling of the residual liquor, more crystals can be obtained ; but these, for the most part, are of inferior purity.

Powders and metallic salts may be washed at first with rain or river water ; but for the last washing, distilled water should be employed.

REMARKS.—Salts are obtained crystallized either by evaporating the solvent, and concentrating the saline particles ; or by cooling the solution, when it is brought to that density at which it will afford crystals. Most saline crystals are obtained by the latter mode. Certainty may be given to this process, by determining with the aid of any convenient hydrometer, the density at which the solution affords crystals, and by evaporation reducing it to this density. On cooling, it will crystallize. It sometimes happens that a degree of refrigeration is required in the saline liquor below that of the mean atmospheric temperature, in which case cold weather should be preferred for this process.

To obtain crystals of proper colour, regular form, and large size, the following are the requisites. 1. Purity of the materials. 2. Slow evaporation of the saline liquor: for which reason the largest crystals are obtained by spontaneous evaporation. 3. A sufficient space in which the crystals may form; hence it is, that crystals of the greatest size and regularity are procured by the large quantity of materials used in manufacturing processes. 4. Rest, or an undisturbed state of the liquor in which the crystals are to form. 5. Foreign solid bodies, pointed or angular, to which the crystals can attach themselves. By attention to these circumstances large and regular crystals of common salt, Alum, emetic Tartar, Tartrate of Soda and Potash, and many other salts are obtained. Should the crystals not appear sufficiently pure, after their removal from the liquor in which they have formed, they should be redissolved in their solvent, and by evaporation and cooling, or by both methods combined, be again made to crystallize: by these means their purity will be much increased, the process of crystallization, in most instances, excluding those foreign bodies which do not enter into the chemical composition of the salt.

END OF PART I.

PART II.

OBSERVATIONS,

&c. &c.

ON

THE DUBLIN PHARMACOPŒIA,

BY DR. MONTGOMERY.

PREPARATIONS.

SECTION VIII.

PREPARATIONS FROM PLANTS.

EXPRESSED OILS.

REMARKS.—These preparations are, with more accuracy, denominated *fixed oils* in the Edinburgh Pharmacopœia, as several of the volatile oils are obtained by expression.

These two species, volatile and fixed oils, the products of various parts of vegetables, have distinct characters.

The former rising into vapour at a high temperature, while the latter cannot be volatilized without undergoing decomposition. They boil at 600°, but then become acrid and empyreumatic, and the oil in this state was formerly used in medicine under the name of *Philosopher's Oil*.

The fixed oils are yielded only by the fruit of vegetables, and in the greatest quantity by the dicotyledonous seeds, such as almonds, which should be used while fresh.

According to MM. Chevreul and Braconnot, they are all composed of Oleine and Stearine in different proportions, and of some other principles less essential to their constitution, but to which they owe the smell,

taste, colour, and the medical properties which distinguish some of them. Fixed oils have various degrees of consistency, from that of the tallow of the *Croton sebiferum* of China, and the butter of the butter tree of Africa, to the fluidity of olive oil; but in general they agree in the common character of being nearly void of smell and taste; they are transparent, viscid, unctuous, with a slight tinge of colour, which may be removed by digestion with charcoal; they are lighter than water, with which they do not mix, except by the agency of some intermediate substance, as mucilage or an alkali. The specific gravity of the different species varies from 0,9403 to 0,9153.

The fixed oils and watery fluids may be made to enter into a very minute and permanent combination, by the addition of a few drops of water of Ammonia, or two or three grains of Carbonate of Potash.

With the alkalies and earths they form soaps, and with metallic oxides plasters.

They combine with fatty substances, wax and resin, to form ointments.

They have various habitudes with regard to Alcohol, in which and ether they are, except castor oil, nearly insoluble.

They however unite readily with each other, and with volatile oils, from which combination are produced many of the perfumed oils.

They possess the power of extracting and dissolving the active principles of several vegetable and animal substances, hence the "*Olea Medicata*" of the Parisian Codex, in which is unaccountably retained the "*Oleum de Lumbricis*."

The quantity of oil to be obtained may be increased by previously roasting the seeds used, or heating the plates of the press, but the quality of the oil is thereby deteriorated, and it is more disposed to become rancid,

in which state it is found to contain Sebacic Acid, and is no longer fit for internal use; but is then said to effect the killing of quicksilver, as it is called, more quickly. *Cold drawn* oils are therefore preferred for medical use.

In the expression of these oils Mr. Brande recommends the use of the *hydraulic press*, by which a great saving of time and power may be gained, the screw presses worked by hand being comparatively very inefficient and inconvenient.

The fixed oils most in use for medical purposes are, the oil of almonds, linseed oil, olive oil, castor oil, and croton oil.

OIL OF ALMONDS.

Bruise fresh Almonds in a mortar, then express the oil by a press without heat.

REMARKS.—The London Pharmacopœia directs the almonds to be macerated for twelve hours before they are bruised; a process which appears unnecessary, as any dirt or dust accidentally adhering to them may be removed by rubbing them in a coarse cloth. Those who make this oil in large quantities blanch the almonds by immersion in very hot water, by which they get rid of the coloured epidermis; they then dry them in a stove, and having ground them in a mill, they enclose them in a hempen bag, and express the oil. The paste which remains being of a good colour, is sold at a better price to the perfumers, and the oil is quite colourless; but from the heat employed it is more disposed to become rancid.

Sweet almonds, if properly pressed, yield from 40 to 50 per cent. according to Mr. Brande, or about half their weight, of oil of specific gravity 932; according to M. Boullay, they contain 54 per cent. of oil, and the

bitter almonds only 28 per cent. according to M. Vogel. The oil consists, according to M. Braconnot, of 76 parts, Oleine, and 24 Stearine in 100 parts.

This oil may be prepared either from the sweet or bitter almonds. The cake or paste of the latter remaining after the expression of the fixed oil, will afford also, by distillation with water, a volatile oil, generally heavier than water, having the concentrated odour of the bitter almond, and some of the properties of Hydrocyanic Acid.—See *Duncan's Supplement to the Edinburgh Dispensatory*, pp. 15, 16.

One hundred weight of almond cake put into the still with 400 gallons of water, will yield from 2 ounces to $2\frac{3}{4}$ by weight. In China almond oil is taken with tea instead of cream.

PROPERTIES.—This oil, when recently prepared, is turbid, but afterwards by rest becomes very clear; it has very little colour, taste, or smell, whether it be obtained from the sweet or bitter almond, the essential oil and Prussic Acid of the latter remaining united with the mucilage and other matters composing the cake, provided heat has not been employed, a very low degree of which is sufficient to cause its impregnation with the volatile oil. The oil of the bitter almond is less prone to become rancid than that of the sweet. Almond Oil is soluble in ether, in the proportion of ten drachms to four ounces of ether.

PHARMACEUTICAL USE.—To form emulsions by the intermedium of an alkali, mucilage or yelk of an egg, e. g. for every drachm of oil, eight drops of liquor potassæ, and an ounce and a half of distilled water, or one part of gum in mucilage to four parts of oil, will be sufficient for their diffusion.

MEDICAL PROPERTIES AND USES.—It is demulcent and emollient, and principally used for forming emulsions in coughs and other pulmonary affections. A mix-

ture of four ounces of almond oil and eight drops of the liquor Plumbi Subacetatis, is said to be an useful injection at the commencement of gonorrhœa. Almond Oil was formerly considered as a medicine “ of great use to women after delivery, to ease their after-pains.”

DOSE.—From half an ounce to an ounce.

LINSEED OIL.

Linseed oil is to be expressed in the same way.

REMARKS.—Linseed, thus treated, yields about 20 per cent. of oil, which contains a large proportion of mucilage. This oil is generally used as met with in commerce, as it is seldom prepared in the Pharmaceutical Laboratory, and when manufactured in large quantities, the seeds are exposed to heat previous to expression, by which a larger quantity of oil is obtained, and with greater facility; for which purpose Virey recommends the exposure of the seeds in hair sieves to the vapour of boiling water, by which they are not only heated but softened, and more easily pressed.

PROPERTIES.—It has a strong disagreeable odour, and a deep yellow colour, specific gravity 932. Four ounces of Alcohol are required to dissolve a drachm of it, but the same quantity of ether takes up a fluid ounce and a half.

MEDICAL PROPERTIES AND USES.—It is emollient and laxative, seldom used internally except in the form of glyster. Externally, when combined with lime water in the proportion of one part to two of the latter, it constitutes a popular and excellent application for *recent* scalds or burns, known by the name of Carron Oil, the efficacy of which may be still further increased by the addition of oil of turpentine. Linseed Oil is a useful

addition to poultices ; on the same principle *Linseed Meal* is employed, which should be the freshly ground linseed, and not the powdered cake from which the oil has been expressed, which is a very inferior article for the purpose.

DOSE.—From half an ounce to one ounce.

As the *Croton Tiglium* is now for the first time admitted into the list of the *Materia Medica* of this *Pharmacopœia*, it appears proper to notice here the expressed oil obtained from that plant, now much used, and known by the name of *Croton Oil*.

REMARKS.—The plant yielding the seed from which *Croton Oil* is obtained, is a native of the *Molucca Islands*.

The seeds which are contained in trilocular capsules, are about the size of a large coffee bean, and very much resemble in form the castor oil nut, and the plants belong to the same natural family. The seeds were formerly much used in medicine under various names ; they are the *Nucula Cathartica* of Geoffroy, by others they were called *Pinei Nuclei Moluccani Purgatorii*, and still more frequently *Grana Molucca*, or *Grana Tiglia* ; but they fell into disrepute, owing to their violently drastic effects, and were almost forgotten until attention was again directed to them by Dr. Ainslie, in his *Materia Medica of Hindoostan*. 100 parts of the kernels of the seeds, when bruised, yield 60 parts of acrid oil, and 40 of farinaceous matter.

QUALITIES.—*Croton Oil* is of a pale reddish brown colour. Its taste is hot and acrid ; it is soluble in Ether and Oil of Turpentine. Alcohol takes up two parts out of three, and the solution possesses the active proper-

ties of the oil; much of what is taken up by the Alcohol is fixed oil. From the experiments of Dr. Nimmo, croton oil is composed of 45 parts, of an acrid purgative principle, and 55 of fixed oil resembling the oil of olives, and not possessed of any cathartic property.

Dr. Nimmo has also shewn, that this acrid principle is resinous, and soluble in Alcohol, Sulphuric Ether, volatile and fixed oils, and that ether and purified oil of turpentine dissolve the whole of the oil: from the knowledge of which fact we are enabled, by digesting the kernels of the seeds in these menstrua, to obtain the oil in as genuine and apparently in a more uniform condition, than by the processes of torrefaction and expression practised in India.

M. Caventou obtained this oil by means of the action of Alcohol, at 100° Fahr. upon the kernels of the seeds reduced to a paste. He allowed it to macerate for 48 hours, and then filtered: he then poured a second and a third quantity of Alcohol upon the paste, which he afterwards submitted to strong pressure; the Alcoholic macerations were then placed in an alembic, and the Alcohol drawn off by distillation. The oil which remained in the alembic was filtered through paper, and preserved in a stopper bottle.

MM. Vauquelin and Pelletier have made some experiments for the purpose of isolating the active principle of this oil, but without success. Dr. Paris thinks, that it bears a strong analogy to *Elatin*, and from the experiments of Caventou, it appears that it is not identical with the Jatrophic acid, as was supposed.

ADULTERATIONS, AND TEST OF ITS PURITY.—From the high price at which croton oil is sold, it is frequently adulterated with the cheaper fixed oils. Dr. Nimmo has suggested the following means of detecting these adulterations.

Pour into a phial, the weight of which is known, 50

grains of the oil; add Alcohol which has been digested on olive oil; agitate well, and having poured off the solution, add more Alcohol of the same kind, until the dissolved portion is diffused in such a proportion of the Alcohol, that each half drachm measure shall contain equal to one dose of the croton oil for an adult; by placing the phial near a fire to evaporate what remains of the Alcohol in the bottle, if the remainder be to that abstracted by the Alcohol as 55 to 45, the oil is genuine. If it be adulterated with olive oil or any other, little soluble in Alcohol, the residuum will be larger; if with castor oil, it will be smaller than in the genuine oil, but it is evident, as remarked by Dr. Duncan, that this test will fail if it be adulterated with a mixture of olive and castor oils.

MEDICAL PROPERTIES AND USES.—It is a powerful hydragogue purgative, and from the smallness of its dose, it can be given in circumstances where other effectual medicines cannot be swallowed. As in cases of coma, apoplexy, mania, or convulsions. It has been found useful in delirium tremens, dropsy, and intestinal tympanites. It is usually given made into pills, with crumb of bread; but the *Tinctura Tiglii* as proposed by Dr. Nimmo, seems a decidedly preferable form for its administration; every half drachm of which contains somewhat more than a drop of the oil; the following is the formula which he recommends:

Tinct. Tiglii ʒ ss
 Syrupi Simplicis
 Mucilag. Gum. Arab. ā ā ʒ ii.
 Aquæ Distillatæ ʒ ss. M—ft. haustus.

And in order to obviate the uneasy feelings likely to be produced in the mouth and throat, he advises “after swallowing a little milk to take the draught very quickly, and wash it down with repeated quantities of

the same diluent." A drop may be given on a lump of sugar; but where there is no dislike to oil, one drop of croton oil with half an ounce of castor oil is a most effectual purge. Besides the effect produced on the alvine evacuations by this oil, the secretion of urine appears to be considerably increased.

In India it is used as an emmenagogue, and it is said with excellent effects, and as an external application in rheumatism.

Rubbed on the skin it sometimes produces its effects actively, and nurses who have been employed to rub it on the abdomen of patients, have been in several instances severely purged. Mr. Conwell states, that the odour of this oil, several times respired over a bottle containing sixteen ounces of it, was sufficient to purge a young girl: while an adult having made the same experiment, suffered only from nausea.

The solution of this oil in oil of turpentine, is said by Dr. Thomson to produce a pustulous eruption when applied to the skin. Dr. Copeland gave a combination of these two oils with great advantage in a case of tetanus.

Great care should be taken in the administration of this medicine, as an over dose will produce most dangerous hypercatharsis. Mr. Houlton mentions a case, in which three drops were given to a strong young man labouring under obstinate constipation: it produced evacuations in the course of fifteen minutes, and soon afterwards his sight failed him, and he became quite blind: in four or five days he recovered the sight of one eye, the other was not restored for a fortnight from the time of taking the oil.

In order to obviate the inconvenience arising from the variation in the size of drops, M. Caventou has proposed the use of a soap, prepared by triturating together two parts of the oil, and one part of liquid caustic soda of the

French Pharmacopœia, without heat; when the compound has acquired a sufficient consistency, it is poured into paste board moulds, after a few days, the soap is to be taken out in slices, and placed in a stopper bottle with a large mouth. This soap given in doses of two or three grains, diffused in water or in the form of pills, produced the same effect as the oil.

Dose.—From half a drop to two drops.

THE DRYING OF HERBS.

PUT the leaves or fresh flowers of the herb, while in blossom, into paper bags, and expose them to a low heat for an hour; then strew them lightly upon a sieve, and dry them as quickly as possible, taking care that their colour be not spoiled by too great a heat; but if the herbs are to be used in the form of powder, they must be immediately powdered; and the powder preserved in well closed opaque phials. Herbs and flowers from which oils are to be obtained, should be dried as soon as collected.

REMARKS.—By drying herbs and flowers, or expelling a great part of the water they contain, those spontaneous chemical changes which are favoured by humidity, are prevented, and they are rendered capable of being preserved. The more quickly they are dried, the more completely in general do they retain their virtues, the mark of which is their retaining completely their native colour. But care should be taken not to apply too much heat, as this would cause the dissipation of their volatile principles, and impair their colour, flavour, and medicinal qualities. The proper heat for most purposes is that above indicated, from 90° to 100° Fahr.

Even when dried they suffer some changes, by keeping, in general from the action of air and light : and some suffer in this way more remarkably than others, as hemlock and foxglove, which have their colour and other properties impaired in a very short time, for which reason they should be kept in very closely stopped bottles, and preserved from exposure to light.

The directions given in this Pharmacopœia, are inferior to those of the London and Edinburgh Colleges, which specify the management of each particular part of the plant to be used, as roots, seeds, &c.

Mr. Battley has proposed the following method of drying narcotic plants destined for preservation : “ The leaves being in a high state of preservation, and entirely freed from the stalks, and as much as possible from external moisture, must be laid in thin layers, in baskets of willow stripped of its bark, in a drying room from which the light is quite excluded. They should be then exposed to a temperature of not less than 130° to 140° of Fahrenheit’s thermometer, for three or four hours, or until the leaves begin to shrivel. They are then to be turned in the same temperature, and the heat kept up for six or eight hours longer, when the operation is generally finished ; which is known by the leaves crumbling without much difficulty in the hand. If the process has been in all its parts properly managed, the result will be, that the leaves retain a beautiful green colour ; and also, in a high degree, the medical properties of the plant to which they belong.”

For preserving them in this desirable state, Chereau and Robiquet recommend as the most convenient vessels, oil jars perfectly clean and dry. The leaves are placed in small layers in those vessels, which must be hermetically closed. The filled jars ought to be kept in a dry and warm place.—*Duncan’s Supplement*, pp. 182-3.

ESSENTIAL OILS.

From the seeds dried with
a medium heat. { Oil of Aniseed,
—— Caraway,
—— Fennel.

Bark and Wood of Sassafras.

From the berries. { Oil of Juniper,
—— Allspice, or Jamaica Pep-
per.

Lavender Flowers.

From the leaves and flowers
of the plant while in
flower. { Oil of Peppermint.
—— Spearmint,
—— Marjoram,
—— Pennyroyal,
—— Rosemary,
—— Rue.

— Savine Leaves.

Put any of these previously macerated in water, into an alembic; then apply heat by means of the vapour of boiling water, and let the liquor distil over into a receiver; the oil must be separated by a proper apparatus from the surface or bottom of the fluid, as it may happen to be lighter or heavier than water. In the distillation of the seeds of caraway and fennel, of the leaves of peppermint, spearmint, and pennyroyal, and of the berries of allspice, the liquor which comes over with

the oil in distillation is to be kept for use, according to the directions laid down in the next chapter.

REMARKS.—To the above list may be added the volatile oils of

Melaleuca	Leucadendron	Oil of Cajeput:
Laurus	Cinnamomum	. Cinnamon.
Eugenia	Caryophyllata	. Cloves.
Citrus	Medica	. . . Lemon-peel.

which are mentioned in the list of *Materia Medica*.

These oils, which are with more propriety denominated *Volatile Oils*, differ in many of their properties from the expressed or fixed oils.

They rise readily in distillation along with the vapour of water; but when distilled alone under the erroneous idea of rectifying or purifying them, they require a temperature considerably above 212° for their evaporation, and are thereby much altered and deteriorated.

Mr. Barry's process of distilling *in vacuo*, has been applied to preparing essential oils with great advantage. Under such circumstances, the water boils at a much lower temperature, and the essential oil is carried over in a state of great purity. A cheaper and easier method which is found to afford nearly as pure oils, is to place the flowers in a basket within the still, and raised above the water, so that only the steam reaches them, which extracts the oil without impairing its fragrance, and carries it over into the receiver.

They are yielded by several parts of vegetables, particularly the flowers, leaves, and the external covering of the seeds; but not by the cotyledons, from which the expressed oils are obtained in the greatest abundance.

The volatile oils may be obtained both from recent and dried plants; when fresh plants are employed they require no previous treatment; but when the plants are

dry, they must be macerated in water, and wood or bark must be previously rasped.

Volatile oils seem to be composed like the fixed oils, of two distinct substances, as for instance, the essence of aniseed or of roses. The latter evidently contains two oils, the one concreté and the other fluid at an ordinary temperature.

Some chemists think, that the volatile oils are not of themselves odorous, and that they owe their fragrance to a peculiar body, which they call *aroma*. M. Robiquet maintains this opinion, and supports it by several experiments. Many of these oils contain camphor, and several of them benzoic acid, which substances they sometimes deposit spontaneously in crystals.

Their ultimate constitution varies very much in different species, some for instance containing oxygen, and others not, or having very different proportions of carbon, hydrogen, and azote, both of which variations may be exemplified in the respective composition of the oils of turpentine and lavender, according to the experiments of M. Theodore de Saussure.

<i>Oil of Turpentine.</i>			<i>Oil of Lavender.</i>		
Carbon,	.	87 . 788	Carbon,	.	75 . 50
Hydrogen,	.	11 . 646	Hydrogen,	.	11 . 07
Azote,	.	0 . 566	Azote,	.	0 . 36
Oxygen,	.	0 . 000	Oxygen,	.	13 . 07
<hr/>			<hr/>		
100 . 000			100 . 00		
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Some of the volatile oils are limpid as water, others are viscid, some congeal on a slight diminution of temperature or are even naturally concrete, and others are capable of forming crystallizations. Their predominant colours are the different shades of yellow and red, but there are also blue, green, and glaucous volatile oils.

There is a remarkable difference in volatile oils with regard to the degree of their pungency and acrimony. These are by no means in proportion, as might be expected, to those of the subject from which they are drawn. The oil of cinnamon, for instance, in its undiluted state, is almost caustic : while that of black pepper is comparatively a bland oil. The pungency resides frequently in a fixed principle, and does not rise with the oil.

Their specific gravities vary from 0,8697 to 1,0439, some being lighter, others heavier than water; so that some of them in the receiver float on the surface of the water, while others sink to the bottom of the vessel, and the complete separation of the oil is effected by an instrument called a separatory. Some essential oils are obtained by mere pressure, as those of lemon, orange, and bergamotte, which exist in vesicles in the rind of the ripe fruit.

Few of the volatile oils are prepared by the apothecary. The oils of aniseed, chamomile, juniper, marjoram, rosemary, and pimenta, are usually imported into England from abroad; while those of lavender, peppermint, spearmint and pennyroyal are annually prepared there on a large scale.

COMBINATIONS.—The volatile oils are sparingly soluble in water, and the solutions constitute many of the *distilled waters*. See next chapter. They are very soluble in Alcohol, forming what are named in perfumery *essences*; they are also dissolved by ether, and the fixed oils: if exposed to the air they absorb oxygen and become resinous, losing their volatility, fragrance, and pungency; hence the necessity of keeping them in small bottles completely full and well stopped. Volatile oils unite with sulphur, and form fetid mixtures called *balzams of sulphur*; with the alkalies and earths they com-

bine imperfectly, constituting what the French call *saponules*.

ADULTERATIONS AND TESTS OF PURITY.—If the specimen submitted to examination be adulterated with *Alcohol*, it will turn milky on the addition of water, and a rise of temperature will be indicated by the thermometer; a decrease of bulk also takes place, which may be appreciated by measuring the oil and water separately, and then transferring them in a state of mixture into a tube of small diameter. The admixture of *fixed oil* may be detected by dropping a little of the suspected article on paper and holding it before the fire, when a greasy stain will remain, or *Alcohol* will dissolve the volatile and leave the fixed oil behind, except castor oil have been used, and then this test will not apply. Sometimes a dearer oil is adulterated with a cheaper, as with oil of turpentine, which may be detected by dipping a piece of paper in the mixture, and drying it with a gentle heat, when the turpentine will be betrayed by its smell. There are, however, other modes of adulteration which defy examination. If a drop of any of these oils be dissolved in *Alcohol* or in water, by means of a small quantity of sugar, the quantity of fluid which it thus impregnates with its flavour, or the degree and quality of flavour which it communicates, to a certain determinate quantity of liquor will be a measure of the goodness of the oil.

PHARMACEUTICAL USE.—For preparing some of the distilled waters.

MEDICAL PROPERTIES AND USES.—For these and the dose, see the subjoined account of the different kinds.

OIL OF ANISE-SEED.

REMARKS.—The greater part of the oil of anise-seed used in these countries is imported from Spain, at a lower price than it could be prepared here.

Mr. Brande says, that the oil distilled in this country from select seeds, is somewhat more fragrant and agreeable than the foreign.

At 50° this oil crystallizes in flat tables, and as this is a leading character it should be attended to in its purchase.

One hundred weight of the seeds yields about two pounds and a half of oil. The specific gravity of that made in England is 9768, according to A. T. Thomson, while Mr. Brande states it to be 9868, that of the foreign oil is 9903.

Anise-seeds yield also an oil by expression of a greenish colour, grateful taste, and strongly impregnated with the flavour of the seeds: sixteen ounces lightly moistened by exposure to the steam of boiling water, are said to afford one ounce of expressed oil, which appears to reside in the kernel of the seeds, the essential in the cortical part.—Lewis's *Materia Medica*, vol. i. p. 104.

ADULTERATIONS AND TESTS OF ITS PURITY.—It is sometimes adulterated with wax, spermaceti, or camphor, the fraud may be detected by the action of cold Alcohol, which will dissolve the oil and leave the wax or spermaceti behind, or simply by evaporation, or by slightly warming the oil, when the crystals, if genuine, will dissolve. According to Dr. Paris, the refractive power of the oil affords a test of its purity.

MEDICAL PROPERTIES AND USES.—It is a warm carminative and stomachic, and as such is frequently

added to pills in cases of flatulence, colic, &c.; it appears to correct the griping effects of some medicines, Geoffroy observes, that milk drawn from the breast soon after this oil has been taken, is found impregnated with its smell.

DOSE.—Five drops to fifteen rubbed up with sugar and given in camphor mixture.

OIL OF CARAWAY-SEED.

REMARKS.—The produce of oil from a given quantity of the seeds is very differently stated, according to Baumé, six pounds yield four ounces and a half of oil, Brande states it at three per cent., and Lewis says, that thirty ounces of the seeds will give one of oil, which has an aromatic odour, and a sweetish, pungent taste; is viscid and of a yellow colour, its specific gravity being 946 Baumé, 9310 Brande.

MEDICAL PROPERTIES AND USES.—It is stimulant and carminative, and is chiefly used as an adjunct in purgative formulæ, with which intention it has been in this Pharmacopœia substituted for the oil of cloves, in the composition of the electuary of scammony, which see.

DOSE.—One drop to ten.

OIL OF FENNEL SEED.

REMARKS.—This oil is not ordered in either the London or Edinburgh Pharmacopœia, and might have been dispensed with in this.

Seventy-five pounds of fennel seeds yield about 30 ounces of a nearly colourless oil, having the odour of

the plant, and a hot, sweetish taste: of specific gravity 997, hence in the distillation it floats on the surface of the water.

Lewis describes this oil as "sweetish, like the oil of aniseed, and like it also congealing, by a slight cold, into a white butyraceous mass," vol. i. p. 371. Virey and others also speak of it as concreting. Dr. Thompson says, in the last edition of his Dispensatory, that it congeals at 50° , but in his *Conspectus* he states the congealing point to be under 32° . In order to ascertain this point, I placed some specimens of this oil in a freezing mixture, but it did not congeal even when the thermometer had sunk to 22° . I was not certain of its purity.

From 960 parts of the seeds Neumann obtained 20 of volatile oil, by Alcohol 84 of resinous extract, 120 of fixed oil, and then by water 129 of a bitter extract.

MEDICAL PROPERTIES AND USES.—It is carminative and stomachic. It is seldom ordered.

DOSE.—Two drops to twenty.

OIL OF SASSAFRAS.

REMARKS. This oil is not ordered in the London Pharmacopœia, and in the Edinburgh it is directed to be made from the bruised root.

Sixty pounds of sassafras, according to Baumé, yield 12 ounces of essential oil. The product, according to Brande, is two drachms from a pound.

This is the heaviest of all the volatile oils, its specific gravity being 1.094. It is a viscid yellow oil of a hot and acrid taste, excoriating the lips when incautiously applied to them.

MEDICAL PROPERTIES AND USES.—It is a stimu-

lant, and is supposed to produce some action on the skin. It is used in chronic rheumatism, and in some cutaneous affections; it is regarded by some as a remedy of some value in syphilitic complaints, but it is very seldom prescribed.

Dose.—Two drops to ten.

OIL OF JUNIPER.

REMARKS.—According to Dehne, forty-eight pounds of bruised juniper berries yield six ounces of oil, while the produce is stated by Lewis to be one ounce from forty: and Mr. Brande states it to be five per cent., the specific gravity of the English oil being, according to Brande 8688, and of the foreign 8834.

Murray says, “there is generally substituted for it in the shops an oil distilled from some species of turpentine, much less grateful, which Alcohol does not dissolve.”

This oil is viscid, has a greenish yellow colour, a hot and acrid taste, and an odour like that of turpentine: when genuine it is soluble in Alcohol; genuine *Hollands* derives its flavour from the oil contained in the juniper berries, but in English gin, oil of turpentine is the usual substitute.

The berries are chiefly brought from Holland and Italy, the Italian berries are in general considered the best.

MEDICAL PROPERTIES AND USES.—It is carminative, and possesses considerable sudorific and diuretic properties: it is given in cases of dropsical effusions, and is often added to pills containing digitalis, or it may be combined with water by means of sugar or mucilage. It appears from the table drawn up by William Alexan-

der, of Edinburgh, that this oil is one of the most powerful diuretics known. See *Duncan's Supplement*, pp. 61-2.

DOSE.—Two drops to ten.

Foderé relates a case in which a pregnant female, in order to produce abortion, took every morning for twenty days, one hundred drops of this oil with impunity, and at the full time brought forth a living child.

OIL OF PIMENTA, OR JAMAICA PEPPER.

REMARKS.—The quantity of oil yielded by pimenta berries varies from one-twentieth to one-hundredth part. The oil is of a reddish brown colour, pungent taste, and an odour like that of cloves, or rather a mixture of those of cloves and nutmegs; it is heavier than water, its specific gravity being 1.021.

MEDICAL PROPERTIES AND USES.—It is stimulant, and is given in dyspepsia and colic. It is an ingredient in the *Emplastrum aromaticum* of this Pharmacopœia.

DOSE.—Three drops to five.

OIL OF LAVENDER.

REMARKS.—About sixty pounds of lavender flowers yield a pound of oil, which is delightfully fragrant, and dissolved in Alcohol constitutes one of our most agreeable perfumes: In point of fragrance, the foreign is vastly inferior to that prepared in England: The oil which comes over first has the most perfect scent, and is often kept separate, and sold at a higher price. This oil is of a lemon colour, and specific gravity 8962. When the

stalks and leaves are used with the flowers, as is sometimes done, the quality of the oil is greatly impaired, and its specific gravity is .9206.

Hill mentions, as a character of the essential oil of lavender, that it contains so much of an acid in it as to be capable of reddening the infusion of violets: Another species of lavender yields the oil which is known among artists by the name of *Oil of Spike*, and much used by them in their varnishes.

MEDICAL PROPERTIES AND USES.—It is stimulant and stomachic, and is sometimes given in hysteria and nervous headach.

DOSE.—One drop to five.

OIL OF PEPPERMINT.

REMARKS.—The quantity of oil yielded by a given weight of the plant varies exceedingly; being, in a dry and warm season, double as great as that obtained when the weather has been cold and wet. The same quantity of fresh peppermint affording, in one instance, three drachms and a half of oil; and in another, not more than one drachm and a half. The oil is of a greenish yellow colour, and has a remarkably pungent taste, leaving on the mouth a peculiar sensation of coldness: its specific gravity is .9070.

Peppermint lozenges are composed of starch, sugar, and mucilage of tragacanth, flavoured with oil of peppermint.

MEDICAL PROPERTIES AND USES.—It is a warm stimulant and carminative, and frequently resorted to in cramp of the stomach, and in flatulent colic; for which it is generally given in the form of *essence of pepper-*

mint, which is a spirituous solution of the oil, coloured green by spinach leaves.

DOSE.—One drop to three.

OIL OF SPEARMINT.

REMARKS.—The produce of oil from spearmint is stated by several to be only one part of oil from 500 of the plant: Lewis says, that ten pounds of spearmint will yield an ounce of oil.

This oil has a flavour like that of peppermint, but less grateful, and not so pungent. Its colour is greenish, specific gravity .9394 according to Mr. Brande; Lewis states it to be .975.

MEDICAL PROPERTIES AND USES.—Similar to those of the oil of peppermint. The different preparations of spearmint are of no small efficacy in allaying irritability of the stomach: see *Infusum menthæ compositum*, of which this oil is an ingredient.

DOSE.—Two drops to five.

OIL OF MARJORAM.

REMARKS.—The average produce of oil from marjoram is from eight ounces to eleven, from 112 pounds of the plant; but it varies much with the season and culture of the plant. The oil has a hot acrid taste, and when carefully made, a pale yellow colour; but by age or too great a heat in the distillation it contracts a reddish hue; its specific gravity is stated by Mr. Brande to be .9090, and by Lewis .940.

MEDICAL PROPERTIES AND USES.—It is too acrid for internal use, but is applied externally as a local sti-

mulant: to allay the pain of tooth-ache, two or three drops on a bit of cotton are put into the affected tooth. Mr. Cooper recommends it as a discutient for the removal of ganglions; rubbed on the head, it is said by Etmuller to recover the sense of smelling when impaired, and to be "one of the best applications in the world to remedy that stuffing of the nostrils so common with infants, and so troublesome to them in sucking;" but he does not say how it is to be applied for the purpose.

OIL OF PENNYROYAL.

REMARKS.—The average produce of oil is one pound from a hundred weight of the plant; the oil is very volatile, coming over quickly in the commencement of the distillation. When newly made its colour is yellow, but by age it acquires a shade of reddish brown. Its specific gravity is stated by Brande to be .9390, by Lewis .978, a solution of this oil in proof spirit, in the proportion of six scruples to a gallon of spirit, constitutes the *Spirit of Pennyroyal*.

MEDICAL PROPERTIES AND USES.—It is a stimulant, and was formerly, and indeed is still, by many supposed to exert its influence especially on the uterus, and to deserve consideration as an emmenagogue and in cases of deficient lochia, and for these purposes it is not unusual to order it in combination with aloetic and chalybeate pills; but its claim to any such influence appears to be very slight if not altogether unreal.

DOSE.—One drop to five.

OIL OF ROSEMARY.

REMARKS.—Lewis states that one hundred pounds of the herb in flower yielded eight ounces of oil: but other writers state the produce of oil to be much less than this. The oil is nearly colourless, and its odour less agreeable than that of the plant; a solution of six scruples of this oil in a gallon of proof spirit constitutes the *Spirit of Rosemary*: its specific gravity is .9118.

MEDICAL PROPERTIES AND USES.—It is stimulant, and is added to liniments, as to soap liniment; its medicinal virtues are lightly esteemed, and it is seldom ordered.

DOSE.—Two drops to six.

OIL OF RUE.

REMARKS.—Cartheuser states the produce of oil to be one pound from 320 pounds of rue. According to A. T. Thomson, who quotes from Baumé, 21 pounds of rue yield only 59 grains of oil. The oil is not very volatile, and does not readily rise in distillation. Lewis obtained from twelve pounds of the leaves, gathered before the plant had flowered, only three drachms of oil; whereas the same quantity of the herb, with the seeds almost ripe, yielded above an ounce. The oil when new is yellow, but becomes brown by age. According to A. T. Thomson, it congeals at 40° Fahrenheit; but the oil which I submitted to experiment did not congeal at 28° Fahrenheit.

This oil is not ordered by the London or Edinburgh College, and might very well have been omitted here.

MEDICAL PROPERTIES AND USES.—It is stimulant, and is esteemed by some as an antispasmodic; it is

sometimes given in hysterical and convulsive affections: rue is a very popular emmenagogue, and as such much abused. See *Extractum Rutæ*.

DOSE.—Two drops to five.

OIL OF SAVINE.

REMARKS.—Savine yields a greater proportion of essential oil than any other plant, two pounds, according to Murray, affording not less than five ounces, which was also the quantity obtained by Hoffman. It is very acrid to the taste, and of a yellow colour, which it loses in a great measure by exposure to light.

MEDICAL PROPERTIES AND USES.—It is stimulant, emmenagogue, and externally vesicant. Its influence on the uterine system is very generally acknowledged, and accordingly it has been much used for the purpose of exciting the menstrual discharge.

When amenorrhæa depends upon a relaxed state of the general system, or an inactive and torpid condition of the uterine system, it may perhaps be used with benefit: Dr. Paris found it “very liable to disturb the stomach, and to produce headach.” “Its great effect, says Hill, “is the promoting the menses, which it will do more forcibly than safely, if not under very careful management.” It enters into the composition of several of those pernicious quack remedies, which are given either to excite the catamenia, or to cause abortion by violently disturbing the uterus. Dr. Dewees records a most melancholy case, in which life was the sacrifice to its wanton administration with the former intention. See his *Compendium of Midwifery*, p. 133-4.

Its power of constantly producing abortion, though generally allowed, is rendered doubtful by not a few

facts, and in those unhappy instances in which it has produced this effect, the unfortunate female has been but too frequently the victim of its activity. Foderé mentions the case of a poor imbecile girl, who in the seventh month of pregnancy took a large dose of powdered savine; a burning heat with hiccup and vomiting succeeded, and these were followed by a violent fever, from which however she recovered, and at the end of two months was safely delivered of a healthy child.

It is by many esteemed as an anthelmintic.

DOSE.—Two drops to six.

RECTIFIED OIL OF AMBER.

Take of the Oil which comes over in the preparation of Succinic Acid, one pound,
Water, six pints.

Distil until two-thirds of the water have passed into the receiver: then separate the oil.

REMARKS.—The oil which is obtained in the preparation of Succinic Acid is very brown and thick; but by re-distillation, as here ordered, the finer parts of the oil are obtained freed from the impurities which remain behind; it retains, however, a very fetid odour. It is one of the empyreumatic oils, being produced by the action of heat upon the amber, in which it does not naturally pre-exist, by which character it differs from an essential oil.

According to Dr. John, of Berlin, 100 parts of the best amber afford 75 parts of oil in the impure state. See p. 65.

Dr. Duncan mentions that an empyreumatic oil is now procured in great quantity, and of extreme purity, as limpid as Alcohol, and burning without residuum, as a bye product in the manufacture of coal gas; as a medicinal article, identical with the finest oil of amber, and nothing inferior to the highly priced native naphtha. Dispensatory, p. 716.

MEDICAL PROPERTIES AND USES.—This oil was formerly much extolled as an antispasmodic stimulant, and as such was used in doses of ten to fifteen drops in hysterical and convulsive affections. It is now scarcely ever administered internally; but it is by some thought useful in whooping cough, when rubbed on the chest. It is one of the ingredients in a celebrated empirical remedy for that disorder, known by the name of *Roche's Embrocation*, said to be composed nearly as follows:

℞ Olei Succini
—— Caryophyllorum ā ā ℥ ss.
—— Olivæ ℥ i.
Misce et fiat Embrocatio.

A mixture of an ounce of this oil with half an ounce of tincture of opium, has been found useful when rubbed on the affected part in tic douloureux.

DOSE.—Five drops to twelve.

OIL OF TURPENTINE.

Take of Common Turpentine, *by weight*, five pounds,
Water, four pints.

Distil the oil from a copper alembic; yellow resin will remain after the distillation.

REMARKS.—In the list of *Materia Medica* prefixed to this *Pharmacopœia*, the *Pinus Sylvestris* is the species named as the source from which to obtain turpentine. In France, at Bordeaux, in the Landes, it is from the liquid resin of the *Pinus Maritima*, that the volatile oil of turpentine is extracted, 250 parts of turpentine yielding from 50 to 60 of oil.

Oil of Turpentine differs from the other essential oils in being very sparingly soluble in Alcohol, for although it dissolves in hot Alcohol, it separates again in drops as the spirit cools. Whereas the turpentine whence it is obtained, dissolves with facility in that menstruum. It is limpid and colourless; very light, volatile, and inflammable, and soluble in six parts of sulphuric ether. Its specific gravity is stated by Mr. Brande to be 8700, and by Dr. Paris to be only 792°. If a stream of muriatic gas be passed through it, a resinous deposit is produced, resembling camphor in some of its qualities, but differing from it in not being soluble in weak nitric acid; nor is it precipitated by water from its solution in strong nitric acid.

Oil of Turpentine has a peculiarly strong and nauseous flavour, which renders it intolerable to many as an internal medicine; for the correction of this either of these two methods may be practised: agitate eight parts of the oil with one part of the strongest Alcohol; let them settle, and when a separation takes place, pour off the Alcohol, repeat this three or four times, and the oil will become almost tasteless and without smell, and if evaporated will leave no residuum; but it speedily returns to its original condition. The same effect may be more speedily produced by distilling it over quicklime, but it is to be doubted whether its medicinal efficacy is not thereby impaired.

The stimulating application known by the name of

Whitehead's Essence of Mustard, is composed of camphor and spirit, or oil of rosemary dissolved in oil of turpentine, with a little flour of mustard added to it.

MEDICAL PROPERTIES AND USES.—It is stimulant, carthartic, diuretic, and anthelmintic; externally it is an efficacious rubefacient. In doses of from half an ounce to two ounces it has been found to act almost as a specific in causing the expulsion of the tape worm. As a purgative it frequently succeeds when all others fail; and is particularly efficacious in the form of glyster. Its utility in epilepsy has been established upon numerous authorities. It is a popular remedy in rheumatism, and Dr. Cheyne, in his *Essay on Gout*, recommends it as a specific in Sciatica; a commendation which, unfortunately, experience has shewn it does not merit.

✦ In gout in the stomach Dr. Mason Good speaks of it in very high terms, as being “the best aperient, and at the same time stimulant medicine in such a case, for which the dose should be about six drachms swallowed unmixed,” vol. ii. 687-8.

In puerperal fever its administration internally, and its application externally to the abdomen, has been found in many instances productive of the happiest results. From its effects in this disease, and in some others, Oil of Turpentine appears to have a specific influence in arresting inflammatory action, when administered in repeated doses: a very happy application of this power has been lately made by Mr. Hugh Carmichael of this city, in the treatment of Iritis, by oil of turpentine, given in drachm doses three times a day.

In America, Oil of Turpentine in doses of a drachm every hour or two, has been successfully administered in cases of yellow fever, in which, says Dr. Chapman, it appears to be soothing in its effects, removing the sense of heat and irritation in the stomach, subduing

the force of vascular action and general excitement, and inducing at once a state of more comfort and security.

It has been recommended by Mr. Colles, as an useful application to wounds received at the dissecting table.

Oil of turpentine is a valuable application to scalds or burns in their recent state, and particularly in the form of liniment composed of it and linseed oil, or with ointment of yellow resin, which latter combination constitutes the *Linimentum terebinthinæ*, which see.

Oil of turpentine has been used with success in the treatment of *purpura hæmorrhagica*. See *Edinburgh Medical Journal*, vol. xviii. p. 540.

It has the singular property of communicating the odour of violets to the urine of those who take it, or who even expose themselves for a short time to its effluvia.

Dr. Copland recommends the addition of tincture of capsicum to correct the nauseating effects which the oil frequently produces on the stomach. The ancients administered turpentine freely in coughs and various pulmonary affections.

DOSE.—As a diuretic, ten drops to a drachm; as a purgative two drachms to an ounce, with the addition of an equal quantity of castor oil.

RECTIFIED OIL OF TURPENTINE.

Take of Oil of Turpentine, two pints,
Water, four pints.

Distil a pint and half of the oil.

REMARKS.—This is commonly called *Spirit of Turpentine*. The rectification is a troublesome process, and

much caution is necessary to prevent the vapours, which are very inflammable, from escaping through the lutings of the vessels, and taking fire. The rectified oil is a little lighter than the common oil, and is free from any resinous admixture; the residuum after the distillation is called *Balsam of Turpentine*.

MM. Boissenot and Persot, in distilling some of this oil which had been for some time exposed to the air, obtained towards the conclusion of the process a quantity of aqueous fluid, colourless and very acid; this liquid contained acetic acid and a peculiar substance, which, when the liquid was exposed for some days to a temperature of 14° Fahr., was afforded in crystals having the form of rectangular prisms; colourless, perfectly transparent, without taste or smell, melting at 302°, and volatilizing without decomposition between 302° and 311°. They were insoluble in cold, but very soluble in hot water, Alcohol and Ether; the solutions were neither acid nor alkaline. Experiments have shewn that this substance does not exist in recently distilled oil of turpentine, but appears to be produced by long exposure of the oil to the contact of air.—*Journ. de Pharm. Avril 1826*.

MEDICAL PROPERTIES AND USES.—Already described.

DISTILLED WATERS.

To each pound of the water obtained by distillation from any vegetable matter, add half an ounce, *by measure*, of rectified spirit.

REMARKS.—Medicated distilled waters may be regarded as aqueous solutions of the essential oils; and accordingly some of them may be prepared from the

essential oil, as hereafter directed at p. 362. The addition of the spirit is intended to prevent the species of decomposition, to which they are liable when long kept, owing to the presence of some vegetable matter which comes over in the distillation; it will also prevent their congelation in winter.

M. Chereau prefers adding the spirit before distillation; because, when it has been previously mixed with the water, and has macerated along with it for a proper time on the plant to be distilled, it then rises, carrying with it all its aromatic principles; the addition of any spirit gives them an unpleasant flavour, and for this and other reasons, a much preferable mode is to re-distil the waters, after which they will keep good for a long time; a common and reprehensible practice, is that of substituting a few drops of the essential oil on a lump of sugar, dissolved in *common* water, instead of the proper distilled water.

The distilled waters, when newly prepared, have an unpleasant empyreumatic odour, which, however, they gradually lose, and for that purpose they ought to be kept for a few days after their preparation, in vessels but slightly covered.

DISTILLED WATER.

Take of Water twenty pounds.

Put them into a glass retort, and having rejected the first pound which comes over, let one gallon be distilled over with a moderate heat.

REMARKS.—Common water always contains foreign matters, from which it may be freed by distillation: the

ammonia not unfrequently contained in common water, from the putrefaction of animal matter; together with the atmospheric air, and other volatile ingredients, come over with the first portion, which is therefore rejected, and the fixed and saline impurities, which are generally the salts of lime, magnesia, and iron, common salt, and the alkaline salts of native vegetables, remain with the portion left in the retort. A retort and receiver should be kept exclusively for this process.

TESTS OF ITS PURITY.—Pure distilled water ought to suffer no change from the addition of nitrate of silver, muriate of baryta, solution of oxalate of ammonia, or a solution of soap in Alcohol and infusion of litmus or blue cabbage.

USES.—Chiefly chemical, but as there are some medical prescriptions, in which its use is very essential to prevent the decomposition which common water might produce, it may be useful to know that it is necessary where any of the following substances are prescribed:

Acidum Sulphuricum, Acidum Citricum, Antimonium, Tartarizatum, Argenti Nitras, Cuprum Ammoniatum, Ferrum Tartarizatum, Hydrargyri Oxymurias, Liquor Ammoniaë, Liquor Plumbi Subacetatis, Liquor Potassæ, Plumbi Acetas, Aqua Muriatis Barytæ, Vinum Ferri, Zinci Sulphas, Ferri Sulphas, Sulphas Quininæ.

Distilled water ought to be used in the formation of extracts, since the residual ingredients of common water will remain with the product, and uselessly increase its bulk, or even in some instances cause chemical changes.

As common water is too often substituted, it would be well when it can be conveniently done, to prescribe some of the medicated waters which in general must have been distilled.

CARAWAY WATER.

Take of Caraway Seeds bruised, a pound.

Pour upon them as much water as will be sufficient to prevent empyreuma. Distil a gallon.

REMARKS.—Mr. Brande observes, that in the distillation of this water there usually remains floating upon it, so large an excess of essential oil as to lead to the supposition that the relative proportion of seed directed to be employed is too large; but if we use a smaller quantity, although we still find an excess of oil, the water is very deficient in flavour.

MEDICAL PROPERTIES AND USES.—It is carminative and stomachic, and is used in flatulent colic and hysteria, and to give warmth to purgatives and prevent their griping.

DOSE.—From one ounce to three.

CINNAMON WATER.

Take of Cinnamon Bark, bruised, a pound,

Water, as much as will be sufficient to prevent empyreuma.

Macerate for one day, and distil a gallon.

REMARKS.—This is a very fragrant and agreeable water, possessing the sweet and cordial flavour of the cinnamon without its astringency. The London College prepares it also from the oil of cinnamon, five scruples of which are ordered instead of the pound of bark. When good it should be milky.

MEDICAL PROPERTIES AND USES.—It is gently stimulant and stomachic, and is chiefly used as an elegant vehicle for nauseous medicines.

DOSE.—From one ounce to three.

FENNEL WATER.

Take of Fennel Seeds, bruised, a pound,
Water, as much as will be sufficient to prevent empyreuma. Distil a gallon.

REMARKS.—Fennel water in cold weather deposits its essential oil in crystals, and loses almost all its flavour.

MEDICAL PROPERTIES AND USES.—It is carminative, and is used with relief in flatulent gripings, with which intention it is frequently given to infants with advantage.

DOSE.—For an infant a drachm, for an adult one ounce to three:

LAUREL WATER.

Take of the fresh leaves of the Cherry Laurel, a pound,
Water, three pints.

Distil a pint, and add an ounce of compound spirit of lavender instead of rectified spirit.

REMARKS.—The addition of the compound spirit of lavender is ordered to prevent the preparation being mistaken for common water, which has unfortunately occurred in more than one instance.

Laurel water is a deadly poison, and if drank in any

large quantity produces almost instantaneous death, unpreceded in general by vomiting, purging, convulsion, or any other warning symptom; in some instances violent disorder of the stomach has been experienced immediately before the fatal event; from the suddenness with which this poison operates, there is in general no time for the trial of antidotes; when they can be tried, brandy and other cordials should be administered. The active principle in this water, as well as in the essential oil of bitter almonds, is the prussic acid, of which it may be considered as a dilute solution.—See *the Observations on Prussic Acid*, p. 62.

Bucholz succeeded in separating the prussic acid from the essential oil of the cherry laurel by agitation with an alkaline solution; Schroöder discovered it in the leaves; Vauquelin in peach blossoms and leaves; Von Ittner in cherry water; and John in the bark of the bird cherry.

When the numerous and fatal proofs of the poisonous nature of this distilled water are considered, it is not without surprise that we find so eminent an authority as A. Richard thus speak of it: “ M. le Professeur Fouquier, voulant reconnaitre les effets de l’eau distillée de laurier cerise sur l’œconomie animale, afin d’apprécier ses propriétés curatives, a fait un très-grand nombre d’expériences a l’hôpital de la Charité, ayant reconnu non sans étonnement, que les doses indiquées pour l’administration de cette substance n’occasionnaient aucun phénomène appreciable, il les a successivement augmentées sans jamais en obtenir aucun effet sensible. Il a porté cette dose à quatre, huit, douze onces, et meme plus dans un seul jour sans que les malades en éprouvassent aucun effet marqué. Croyant d’abord qu’un semblable resultat pouvait dépendre de la mauvaise preparation du medicament, il s’est ensuite servi de cette eau distillée, préparée chez les meilleurs pharmaciens de Paris, et les

résultats ont toujours été les mêmes. J'ai moi-même été témoin de ces faits. On doit naturellement en conclure que l'eau distillée de laurier-cerise n'est point aussi active qu'on le croit généralement et que son usage trop incertain doit la faire bannir de la thérapeutique." *Botanique Medicale*, pp. 522-3. And even greater quantities than those above mentioned were given by him with impunity.

MEDICAL PROPERTIES AND USES.—It is a direct and powerful narcotic sedative: it has been used with advantage in tic douloureux, phthisis pulmonalis, spasmodic cough, and in palpitations of the heart.

DOSE.—Half a drachm to a drachm.

PEPPERMINT WATER.

Take of the herb Peppermint, a pound and a half,
Water, a sufficient quantity to prevent empyreuma. Distil a gallon.

In the same manner are prepared Spearmint water and Pennyroyal water, from the herbs spearmint and pennyroyal.

REMARKS.—This is one of the most useful of the distilled waters.

MEDICAL PROPERTIES AND USES.—It is warm and agreeable to the stomach, and carminative, particularly if taken warm; with this intention it is sometimes used alone. It is also an useful adjunct to Senna, Rhubarb, and other nauseating remedies of that kind.

Spearmint water differs but little from peppermint water, its flavour is to most persons less agreeable; spearmint water or an infusion of the leaves, as in the following formula, sometimes has an excellent effect in

stopping long continued vomiting and retching, and quieting the stomach.

℞ Infus. Menthæ Viridis ℥ vi.

Spirit. Vin. Gallici deflagrantis ℥ i.

Tinct. Opii. Camph. ℥ i.

Sacchari Albi ℥ ss.—sumat cochleare magnum quadrantibus horis donec cessaverit vomitus.

Pennyroyal water is used for the same purposes as peppermint water.

ROSE WATER.

Take of the petals of the hundred-leaved rose, eight pounds,

Water, a sufficient quantity to prevent empyreuma. Distil a gallon.

REMARKS.—This water has the sweet perfume of the rose in great perfection, when well prepared: considerable care should be taken in gathering and picking the rose leaves, and the distillation should be conducted slowly. Rose water is apt to spoil and become sour unless it be rectified by a second distillation: but spirit of wine ought not to be added to rose water, as it communicates a stimulating power to it, which renders it unfit for some of its most general applications. Sometimes rose leaves are preserved for distillation by being salted; they retain their odour, and the water may be drawn from them when wanted, and equals in fragranciness that from the fresh petals.

Attar of roses is said to be prepared by putting a quantity of carefully picked rose leaves into a clean jar, or other convenient vessel, with water enough to cover

them; the vessel is then set in the sun, and in about a week the attar collects in the form of a scum on the surface, and is removed by a piece of cotton. Rose water was first made in Persia, and the Persian rose water was long celebrated for its excellence. The rose water of Faïoum, in Upper Egypt, also enjoys a great reputation. See a very interesting account of the different preparations of roses in *Dr. Duncan's Supplement*, pp. 95, 159.

MEDICAL PROPERTIES AND USES.—Rose water being a distilled water, free from any acrimony, and of an agreeable smell, is much used in the formation of collyria and other lotions.

PIMENTA WATER.

Take of Pimenta berries, bruised, half a pound,
Water, sufficient to prevent empyreuma.

Macerate for twenty-four hours, and distil a gallon.

REMARKS.—Pimenta water, when recently distilled, has a brownish hue, and after some time deposits a brown sediment of a resinous nature.

MEDICAL PROPERTIES AND USES.—It is carminative and aromatic; and as such is given in dyspepsia. It is also pharmaceutically useful as a solvent of bitter extracts.

Cinnamon water, peppermint water, spearmint water, and pennyroyal water, may be prepared in another way, viz. by adding to each gallon of water, instead of the herb, three drachms of its essential oil, and then distilling the mixture in a proper apparatus by the application of heat.

REMARKS.—When distilled waters are prepared in this way, they keep for a great length of time without spoiling, as no mucilaginous principle can be present.

SULPHURIC ETHEREAL LIQUOR.

Take of Rectified Spirit,
Sulphuric Acid, of each thirty-two ounces
by weight.

Pour the spirit into a glass retort adapted to bearing a sudden heat, and then pour on the acid in an unbroken stream; mix them gradually, and let twenty ounces *by measure* of the liquor be distilled with a sudden and sufficiently strong heat, into a receiver kept cold.

If sixteen ounces of rectified spirit be poured upon the acid remaining in the retort, sulphuric ethereal liquor will again come over by distillation.

REMARKS.—This preparation is the *Ether Sulphuricus* of the London and Edinburgh Colleges; the ether thus obtained is by no means pure, as it contains Alcohol, water, and sulphurous acid; from which it is freed by re-distilling it in contact with carbonate of potash, as directed in the next preparation. In the former Dublin Pharmacopœia, the spirit was ordered to be previously heated, which is unnecessary and unsafe. The retort used should be very thin, and of flint glass, and in order that the liquor may boil immediately a heat of 200° should be applied *at once*, because if the heat be gradually raised to this point, part of the Alcohol comes over unaltered. The receiver should be kept very cold, which may be conveniently done by laying over it narrow shreds of moistened woollen cloth, with one end of

each immersed in a vessel of cold water, placed higher than the receiver, so that the water is made to trickle constantly over it; by the evaporation of the water the receiver is kept cold, and at the same time its contents can be distinctly seen, which is not the case when it is immersed in ice or snow. Towards the end of the process a white vapour comes over, on the appearance of which the distillation should be stopped. The specific gravity of the fluid thus obtained is .768, that which comes over after the addition of the new portion of spirit, is of spec. grav. .807. If the two products be mixed, the mixture will have a spec. grav. .788. Mr. Phillips, by operating with the quantities ordered by the London College, which are a pound and a half each of rectified spirit and sulphuric acid, obtained twelve ounces of product, of which eleven ounces and a quarter were ether. Owing to the great inflammability of the vapour of ether, the utmost caution is required in the distillation of its preparations: Dr. A. T. Thomson says, that the luting which answers best in this operation is common paste spread on slips of cloth, which are to be first applied, and when dry surrounded with pieces of wet bladder; and as considerable risk is incurred by fire, high pressure steam is not only very conveniently but very often economically applied as the source of the required heat. In repeating the process with the addition of fresh Alcohol, a second production of ether ensues, but a much larger relative proportion of unaltered Alcohol passes over than in the first distillation.

Thenard divides ethers into three classes according to their composition. *The first* are those formed of hydrogen, carbon, and oxygen, and arising from the action of Alcohol on acids which have a strong affinity for water, and which do not easily evaporate. They contain none of the acid employed and are identical: to this kind belong the sulphuric, phosphoric, arsenic and fluo-boric ethers. *The second* are those which result

from the combination of bi-carburetted hydrogen, with the acid employed to form them; of these there are two, hydro-chloric and hydriodic ethers; to these might be added the hydro bi-carburet of chlorine. *The third* are those composed of Alcohol and the acid employed to form them; of these there are seven. The nitric or rather hypo-nitrous, acetic, benzoic, oxalic, citric, tartaric, and gallic ethers; the first two of which are more volatile than Alcohol, the others much less so.

The theory of etherification is by no means agreed on; the general opinion of the best authorities is, that the acid abstracts hydrogen and oxygen from the Alcohol, in the proportion in which these gases form water, and that ether is nothing more than Alcohol deprived of one half of its elementary water, so that the relative atomic constitution of these fluids may be expressed thus:

	Carbon.		Oxygen.		Hydrogen.
Alcohol	24	+	16	+	6
Ether	24	+	8	+	5

An interesting confirmation of this view of the process is derived from the action of fluoboric gas upon Alcohol, which strongly attracting the elements of water, abstracts them from the Alcohol and affords a product having the characters of sulphuric ether.

Ether, however, is not the only product from the distillation of equal parts of Alcohol and sulphuric acid. While the sulphuric acid acts on the Alcohol, the latter re-acts on the acid, and in consequence a peculiar acid is formed, and an oil, and there takes place a disengagement of sulphurous acid, carbonic acid gas, and bi-carburetted hydrogen or olefiant gas.

The peculiar acid thus produced, was first noticed by M. Dabit, about the year 1800, and has been called *ænothionic* or *sulpho-vinic* acid; it has been examined by Sertuerner, Vogel, and Gay Lussac, and the two last regard it as a compound of hypo-sulphuric acid, and a peculiar vegetable matter.

Mr. Hennel, however, has lately given a different, and to all appearance a more correct view of its nature. According to him, sulpho-vinic acid and the oil of wine, are both composed of sulphuric acid and carburet of hydrogen.

The oil of wine, which has no acid re-action when pure, consists of two atoms of sulphuric acid, eight of carbon, and eight of hydrogen. When heated it parts with half of its carbon and hydrogen, and sulpho-vinic acid remains, consisting of two atoms of sulphuric acid, four of carbon, and four of hydrogen.—*Journal of Science*. vol. xxi. p. 331.

A detailed account of the numerous speculations and theories on this subject, would run to a length quite unsuited to a work such as the present.

Ether, though very imperfectly understood till 1730, is however of more ancient origin; Valerius Cordus described it in 1537.

MEDICAL PROPERTIES AND USES.—For these see the remarks on sulphuric ether.

SULPHURIC ETHER.

Take of Sulphuric Ethereal Liquor, *by measure*,
twenty ounces,
Carbonate of Potash, dried and powdered,
two drachms.

Mix them, and from a very high retort distil, by a very gentle heat, twelve ounces *by measure* into a receiver kept cold. The specific gravity of the liquor should be to that of distilled water, as .765 to 1000.

REMARKS.—The ether obtained in the former process contains Alcohol, water, and sulphurous acid. When the carbonate of potash is added to it, it takes up the acid and water; and by stopping the distillation when three-

fifths have come over, the Alcohol is left with the residual ingredients, or at most but a very small portion passes over, from which the ether may be freed by agitation with water, or if this were done with the unrectified ether previous to distillation from the potash, the ether might be obtained in its purest form.

This is similar to the Ether Rectificatus of the London College, and differs from the last preparation only by its being in a state of greater purity, though not entirely pure, as it still contains some water and Alcohol.

The specific gravity stated here to be that of sulphuric ether, does not agree with the results obtained by others. Mr. Brande obtained it of a specific gravity so low as 700, and Lowitz is said to have procured it of .632 by the following process :

To ether reduced to specific gravity .746 by means of carbonate of potash, he added as much dry powdered muriate of lime as it would dissolve. On standing, the mixture separated into two parts, the Alcohol holding the salt in solution sunk to the bottom ; the ether swam on the surface, and its specific gravity was now only .632 in the temperature of 60° Fahr.—*Thomson's Chemistry*, 4th ed. vol. ii. p. 443.

In conducting the process on the large scale, one hundred pounds of Alcohol and one hundred pounds of sulphuric acid were found to yield fifty-two pounds of ether, of specific gravity .761, and after the addition of fifty pounds more of spirit to the residue in the still, a second distillation produced from forty-six to fifty pounds of ether, of specific gravity .765.

From one hundred pounds of impure ether thus obtained, there were procured from fifty-five to fifty-eight pounds of *rectified ether* of specific gravity .733.

Sulphuric ether is transparent and colourless, ex-

tremely volatile, of a fragrant smell and pungent taste; under the mean pressure of the atmosphere it boils at 98° , and is converted into a highly inflammable vapour, the specific gravity of which is to that of air as 2,586 to 1,000. In vacuo ether boils at 20° , it congeals at -46° in brilliant transparent plates. It is a powerful solvent, as it dissolves the resins, fixed and volatile oils, wax, balsams, camphor, extractive and phosphorus; it takes up about a twentieth of its weight of sulphur, combines with ammonia, but does not dissolve potash or soda, or their carbonates. It unites with Alcohol in all proportions, but requires ten parts of water for solution.

ADULTERATIONS AND TESTS OF ITS PURITY.—Its specific gravity is a good test of its purity; a solution of barytes, or litmus will detect sulphuric acid. If Alcohol be present, phosphorus will be imperfectly dissolved, and a milky fluid will be the result.

M. Gay Lussac has observed, that when kept for a considerable time without disturbance it undergoes spontaneous decomposition, and that acetic acid, perhaps some Alcohol and a particular oil are produced from it.

MEDICAL PROPERTIES AND USES.—Ether is a powerful and diffusible but transient stimulant; it is also narcotic and antispasmodic; externally, it may be used as a powerful refrigerant by allowing it to evaporate;* or on the contrary, by preventing its evaporation, it may be made an active rubefacient. As a stimulant it is of advantage in low fevers, as a refrigerant it is used to reduce the temperature of the head in fever, or of scalded or burnt parts; as an antispasmodic it is administered with advantage in hysteria, and to stop the approaching paroxysm of epilepsy, for the latter purpose

* When *Sulphuric* and *Muriatic Ethers* are mixed together in equal proportions the evaporation is very rapid, and a degree of cold considerably below 0 of Fahrenheit is said to be produced.

ammoniated tincture of valerian is an useful addition. In sea sickness great relief may be obtained by swallowing a tea-spoon full of ether in a glass of white wine; ear-ach is sometimes much relieved by a few drops of ether poured into the meatus auditorius.

Ether is sometimes productive of singular relief in flatulence of the stomach, and may be taken thus :

℞ Etheris, drachmam.

Aquæ, uncias sex.

Ol. Carui, guttas sex.

Aq. Menth. pip. unciam.

Sacchari albi. drachmas tres. sumat unciam subinde.

DOSE.—Half a drachm to two drachms.

OILY ETHEREAL LIQUOR.

Take what remains in the retort after the distillation of sulphuric ether.

Distil down to one half, with a moderate heat.

REMARKS.—This preparation is very generally called *sweet oil of wine*; and may be obtained more directly, though less economically, by distilling one part of Alcohol by measure, with one of sulphuric acid; it also comes over, and sometimes in considerable quantity, in the usual process for making carburetted hydrogen or olefiant gas. It may be best purified by washing it with a weak solution of carbonate of potash; its specific gravity is 1,060. It is soluble in ether and Alcohol, but insoluble in water. It is thick and oily, of a yellow colour, less volatile than ether. In its composition and general characters it resembles the essential oils; but its nature is not clearly ascertained.

MEDICAL PROPERTIES AND USES.—I am not aware of any use to which this fluid is applied in medicine,

except as a constituent of *Hoffman's Anodyne Liquor*, which is said to be prepared by mixing two parts of rectified spirit with one of sulphuric ether, each taken by measure, and adding to every eight ounces of this mixture one drachm of oily ethereal liquor; in imitation of which the *Spiritus Etheris Sulphurici Compositus* is introduced into the London Pharmacopœia.

NITROUS ETHER.

Take of Nitrate of Potash, purified, dried and coarsely powdered, a pound and a half,
Sulphuric Acid, a pound,
Rectified Spirit, *by measure*, 19 ounces.

Put the nitrate of potash into a tubulated retort placed in a bath of cold water, and pour on it by degrees and at intervals the sulphuric acid and the spirit, previously mixed and cooled after their mixture. Without almost any external heat, or at most a very gentle one, (as of warm water added to the bath,) the ethereal liquor will begin to distil without the application of fire; in a short time the heat in the retort will increase spontaneously, and a considerable ebullition will take place, which must be moderated by reducing the temperature of the bath with cold water; the receiver must also be kept cold with water or snow, and furnished with a proper apparatus for transmitting the highly elastic vapour (bursting from the mixture with great violence if the heat be too much increased) through a pound of rectified spirit contained in a cooled phial.

The ethereal liquor thus spontaneously distilled, is to be received into a phial with a ground glass stopper, and there must be added by degrees (closing the phial after each addition) as much very dry and powdered car-

bonate of potash as will suffice to saturate the excess of acid, using litmus as a test; this is effected by the addition of about a drachm of the salt; in a short time the nitrous ether will rise to the surface, and is to be separated by means of a funnel.

If the ether be required very pure, distil it again to one half, from a water bath at a temperature of 140° . Its specific gravity is to that of distilled water as 900 to 1000.

REMARKS.—In this process the nitrate of potash is decomposed and nitric acid formed, which acts on the Alcohol as it evolves. This action is very violent, and renders the formation of this ether a process of considerable difficulty, to obviate which many ingenious plans have been suggested. The mode of operating above described is well adapted for procuring it with facility and safety. It was contrived by Wolfe, and was found by Pelletier to answer better than any other.

M. Boullay first proposed funnels with stop-cocks in the centre of the tube, for the preparation of ethers: a description of his apparatus was first published in the *Annales de Chimie*, tom. lxii. and lxiii., and afterwards more in detail in vol. iii. of the *Bulletin de Pharmacie*, p. 145.—See *Duncan's Supplement*, p. 148.

The exact nature and composition of this ether are by no means well known; there can be no doubt, however, of its being formed of a portion of each of the elements of the acid and spirit, both of which are decomposed. It is one of Thenard's third class of ethers, as before mentioned, and according to him it consists of,

Oxygen	48.52
Hydrogen	8.54
Azote	14.49
Carbon	28.45
	<hr/>
	100.00

And speaking of its preparation he says, “ nitric ether is not the only product obtained in this operation. We obtain also much protoxide of azote and water, some azote, deutoxide of azote, carbonic gas, nitrous acid gas, acetic acid, and a matter easily carbonized. We must suppose then that a portion of Alcohol is completely decomposed by the nitric acid; that it yields almost all its hydrogen to the oxygen of this acid, and that thence result all the products foreign to the ether, whilst Alcohol and nitrous acid unite to constitute the ether properly so called; all the ether is set at liberty as well as the azote, the protoxide and deutoxide of azote, and carbonic gas. The water, the nitrous acid and acetic acid, are disengaged only in part, as happens also to the Alcohol and nitric acid, which escape the reciprocal action.”

Thenard prepared this ether from equal weights of Alcohol and nitric acid; from five hundred grammes of Alcohol and five hundred grammes of acid, about one hundred grammes of excellent ether were obtained.

Nitrous ether does not redden litmus; it is of a slightly yellowish colour, arising perhaps from the presence of a small portion of nitric oxide; it is more volatile but less fragrant than sulphuric ether; it boils at 70° , and if poured on the hand ebullition immediately takes place, and very considerable cold is produced; it is very inflammable, combines with Alcohol in every proportion, but is sparingly soluble in water, of which it requires forty-eight parts for solution; when kept for some time it suffers a spontaneous change, and becomes perceptibly acid; and as this change is promoted by heat, it should be kept in a cool place: it is decomposed by the contact of water.

MEDICAL PROPERTIES AND USES,—Similar to those of sulphuric ether, but it is very seldom used.

NITROUS ETHEREAL SPIRIT.

Add to the matter which remains after the distillation of nitrous ether, the rectified spirit employed in that operation for condensing the elastic vapour, and distil till the residuum be dry, with the *greater* heat of a water bath. Mix the distilled liquor with the alkaline liquor which remains after the separation of the nitrous ether, and add moreover as much well dried Carbonate of Potash as shall be sufficient to saturate the predominant acid. This is made evident by the test of litmus. Lastly, distil as long as any drops come over by the medium heat of a water bath.

The specific gravity of this liquor is to that of distilled water as 850 to 1000.

Nitrous ethereal spirit may also be prepared by adding gradually two ounces of nitric acid to a pound *by measure* of rectified spirit, and distilling twelve ounces with a proper apparatus and the application of a gentle heat.

REMARKS.—The Alcohol already impregnated with a small portion of nitrous ether, and the acid contained in the residual matter of the last process, when mixed and heated act reciprocally on each other, and a compound of nitric ether, unchanged Alcohol and free nitric acid comes over; but the acid being removed by the alkali added before the second distillation, a change necessarily takes place in the chemical and medical properties of this new product. This spirit will be most economically prepared by the second process ordered, (which is nearly that of the London College,) inasmuch as the latter does not include the previous preparation of nitrous ether, which is but little used. It has been long known and much employed under the name of *sweet spirit of nitre*. If

added in very small proportion to malt spirit it gives it the flavour of French brandy.

It is colourless, has a fragrant ethereal odour, taste pungent and acidulous; it is very inflammable and volatile, but not so much so as sulphuric ether, and therefore does not occasion so much cold by its evaporation. If the distillation be carried too far, the product is heavier, high coloured, of less agreeable odour, and very acid. It is soluble both in water and Alcohol, the specific gravity of this ether is stated to be 834.

MEDICAL PROPERTIES AND USES.—It is refrigerant, diaphoretic, antispasmodic and diuretic; with the latter intention it is a valuable auxiliary in dropsical affections, and may be thus given with great advantage:

Tinct. Digitalis ℥.

Spirit. Ether. Nitros ℥ i.

Mist. Camphoræ ℥ ii ss.

Sumat unciam ter die.

DOSE.—From twenty to sixty drops.

ALCOHOL.

Take of Rectified Spirit, a gallon,

Pearl-ashes, dried and still hot, three pounds
and a half,

Muriate of Lime, dried, a pound.

Add the pearl-ashes in powder to the spirit, and let the mixture digest in a covered vessel for seven days, shaking it frequently. Draw off the supernatant spirit and mix with it the muriate of lime; lastly distil with a moderate heat until the mixture in the retort begins to thicken. The spec. grav. of this liquor should be 810.

REMARKS.—Rectified spirit of specific gravity 840 contains 17 per cent. of water, to free it from which is the object of the above process. The attraction of the carbonate of potash and muriate of lime for water is much greater than that of the spirit; the water therefore combines with these substances, and is prevented from rising with the spirit during the distillation.

When the dried alkaline salt is added to the spirit, the mixture in the course of two or three days exhibits three distinct strata; the lowermost containing a part of the undissolved salt, the middle, a watery solution of the alkali, and floating over this, the spirit deprived of much of its water. This latter portion is to be drawn off, then mixed with the muriate of lime, and the mixture distilled. The muriate of lime, by its strong attraction for water, deprives the spirit of almost the whole of the water remaining after the action of the alkali, and by distillation the Alcohol is obtained separate from the muriate of lime which remains in the retort united to the water. By these means the Alcohol comes over very highly concentrated.

As a second deaquating addition, the muriate of lime is much to be preferred to the carbonate of potash as used by the London College, because the muriate of lime being soluble in Alcohol, comes in contact with every particle of water contained in the spirit.

Mr. Graham lately read a paper before the Royal Society of Edinburgh, describing a new and very ingenious method of rendering spirit stronger, and indeed of procuring absolute Alcohol. He enclosed four ounces of spirit, of specific gravity 825 at 60° Fahr. under the receiver of an air pump, in which there were also enclosed about twelve ounces of unslaked lime, and exhausted the air. The specific gravity was taken every twenty-four hours, and it underwent the following changes:

Day	1st	2d	3d	4th	5th	6th	7th
Spec. Grav.	.825	.817	.809	.804	.799	.797	.796

This is the absolute Alcohol of Richter. Dr. Hope repeated the experiment, and in fourteen days reduced spirit of 835 to below 800.

It is necessary for the success of this process, that the temperature of the place should not vary much, as otherwise distillation of the spirit takes place by its occasional condensation on the plate of the air-pump, and cold side of the receiver; and the quantity of lime must be sufficient to absorb the whole water, but not in great excess, otherwise the Alcohol is also absorbed by it. *Duncan's Supplement*, pp. 12-13.

Alcohol of the specific gravity 810 as here directed, is not entirely free from water, but contains something more than five parts of it in the 100. The purest Alcohol that has been obtained is of specific gravity 796 at 60° Fahr.

Chereau and Robiquet mention, that one means of ascertaining if Alcohol be pure, is to put into it a fragment of anhydrous caustic barytes, which remains entire if the Alcohol be well deprived of water, but immediately deliquesces if the Alcohol contain water, however little.

The boiling point of Alcohol at 810 is about 174°, and as the specific gravity is increased the boiling point is raised, so that its strength may be known by the degree at which it boils. In vacuo it boils at 56°.

Alcohol of specific gravity 867, enclosed in a bladder and exposed to the air for some time, was found to have its specific gravity lowered to 817. If this observation be confirmed, it would afford a very cheap and easy mode of depriving spirit of its water; subsequent distillation might deprive it of any unpleasant flavour derived from the bladder: hence it would appear, that the diminution

of liquid in jars containing anatomical preparations, is owing to the escape of water rather than of spirit.

For the detail of some experiments instituted to determine this point.—See *Duncan's Supplement*, pp. 10-11.

Pure Alcohol cannot be frozen; though rectified spirit may, by the rapid evaporation of sulphurous acid.

According to Saussure, Alcohol consists of

Carbon	52,17 or 2 Atoms	=	12
Oxygen	34,79 1 ———	=	8
Hydrogen	13,04 3 ———	=	3
<hr/>			<hr/>
100,00		Weight of its Atom	23

Wines and other fermented liquors derive their intoxicating power from the presence of Alcohol, which is contained in considerable quantity in some of the wines in common use, as may be seen in Mr. Brande's Table, from which the following are selected as being most generally used:

Proportion of Spirit per cent. by measure.				Proportion of Spirit per cent. by measure.			
Port	...	...	25.83	Claret	..	...	17.11
Ditto	...	...	19.00	Ditto	...	..	12.91
Average	...	...	22.96	Average	...	...	15.10
Madeira	..	...	24.42	Malmsey Madeira			16.40
Ditto	..	...	19.24	Sauterne	...	...	14.22
Average	...	...	22.27	Burgundy	...	...	16.60
Sherry	...	...	19.81	Ditto	...	..	11.95
Ditto	...	...	18.25	Average	..	...	14.57
Average	...	...	19.17	Hock	...	...	14.37
Teneriffe	...	..	19.79	Ditto (old in cask)			8.88
Cape Madeira	...	...	22.94	Average	..	...	12.08
Ditto	..	...	18.11	Champaigne, still			13.80
Average	...	...	20.51	Ditto, sparkling	...	...	12.80
Calcavella	...	...	19.20	Ditto, red	..	..	12.56
Ditto	..	..	18.10	Ditto, do.	...	...	11.30
Average	..	..	18.65	Average	..	...	12.61

Alcohol is colourless, has a fragrant odour and a highly pungent taste; it is very inflammable, burning with a blue flame without smoke, and during its combustion water and carbonic acid are formed, the quantity of the water exceeding that of the Alcohol consumed. It unites with water in every proportion, and their union is accompanied with a considerable evolution of heat, and also a compenetrations; that is, the bulk of the resulting fluid is less than that of the two before their admixture. On account of its great affinity for water, it precipitates many of the neutral salts from their aqueous solutions. It dissolves many saline bodies, and is the proper solvent of the greater number of the proximate principles of vegetables. It also dissolves soap, vegetable extract, sugar, oxalic, camphoric, tartaric, gallic, and benzoic acids; volatile oils, resins, and balsams; it combines also with sulphur and the pure fixed alkalis, but not with their carbonates.

M. Gay Lussac has constructed an instrument which he calls an Alcohometer; the scale is divided into 100°. Each of these degrees indicates the proportion of pure Alcohol contained in 100 parts of a mixture. Thus, for instance, when the instrument indicates 25°, it signifies that 100 parts of the liquor submitted to proof contains 25 of pure Alcohol and 75 of water. Pure Alcohol indicates 100°.

MEDICAL PROPERTIES AND USES.—It is a powerful stimulant, but is seldom used except in combination; by its evaporation it is useful in refrigerant lotions; but it is chiefly used for pharmaceutical purposes.

THE following Table, drawn up by Lowitz, with an additional column by Dr. Thomson, shows the Specific Gravity of different Mixtures of pure Alcohol of a specific gravity .791, and Distilled Water, at the temperature of 60° and 68° of Fahrenheit.

100 parts by weight.		Specific Gravity.		100 parts by weight.		Specific Gravity.		100 parts by weight.		Specific Gravity.	
Alco.	Wat.	at 68°	at 60°	Alco.	Wat.	at 68°	at 60°	Alco.	Wat.	at 68°	at 60°
100	—	791	796	66	34	877	880	32	68	952	955
99	1	794	798	65	35	880	883	31	69	954	957
98	2	797	801	64	36	882	886	30	70	956	958
97	3	800	804	63	37	885	889	29	71	957	960
96	4	803	807	62	38	887	891	28	72	959	962
95	5	805	809	61	39	889	893	27	73	961	963
94	6	808	812	60	40	892	896	26	74	963	965
93	7	811	*815	59	41	894	898	25	75	965	967
92	8	813	817	58	42	896	900	24	76	966	968
91	9	816	820	57	43	899	903	23	77	968	970
90	10	818	822	56	44	901	904	22	78	970	972
89	11	821	825	55	45	903	906	21	79	971	973
88	12	823	827	54	46	905	908	20	80	973	274
87	13	826	830	53	47	907	910	19	81	974	975
86	14	828	832	52	48	909	612	18	82	976	
85	15	831	†835	51	49	912	915	17	83	977	
84	16	834	838	50	50	914	917	16	84	978	
83	17	836	840	49	51	917	920	15	85	980	
82	18	839	843	48	52	919	922	14	86	981	
81	19	842	846	47	53	921	924	13	87	983	
80	20	844	848	46	54	923	226	12	88	985	
79	21	847	851	45	55	925	928	11	89	986	
78	22	849	853	44	56	927	†930	10	90	987	
77	23	851	855	43	57	930	933	9	91	988	
76	24	853	857	42	58	932	†935	8	92	989	
75	25	856	860	41	59	934	937	7	93	991	
74	26	859	863	40	60	936	939	6	94	992	
73	27	861	865	39	61	938	941	5	95	994	
72	28	863	867	38	62	940	943	4	96	995	
71	29	866	870	37	63	942	945	3	97	997	
70	30	868	871	36	64	944	947	2	98	998	
69	31	870	874	35	65	946	949	1	99	999	
68	32	872	875	34	66	948	951	—	100	1000	
67	33	875	879	33	67	950	953				

SPIRITS.

REMARKS.—With the exception of the Spirit of Ammonia and the Compound Spirit of Lavender, the spirits ordered in this Pharmacopœia, are, for the most part, solutions of the essential oils of vegetables procured by distillation from the vegetable substance previously macerated in Alcohol of greater or less density; in the greater number proof spirit is used, because Alcohol being more volatile than many of the essential oils, they would not rise readily in distillation with it.—See Table, p. 389.

The proof spirit met with in the shops is seldom pure, and hence these distilled spirits have frequently a disagreeable flavour, however carefully prepared.

SPIRIT OF AMMONIA.

Take of Rectified Spirit, three pints,
Carbonate of Ammonia, coarsely powdered,
three ounces and a half.

Mix them, and dissolve the salt with a medium heat, then filter the liquor.

REMARKS.—This has been altered from the more operose mode of the former Pharmacopœia, in which the spirit was directed to be mixed with the muriate of ammonia and potashes, and distilled; during the solution in the heated Alcohol the carbonate of ammonia is decomposed, and carbonic acid gas disengaged from it with effervescence, by which it is converted from the state of Sesquicarbonate into that of Carbonate, of which about 30 grains are taken up by each ounce measure of the Spirit, and exist in the solution in the same state of combi-

nation as that in which it exists in the preparation made by the old process.

It is transparent and colourless; smell pungent; taste acrid; it changes the colour of turmeric paper, indicating its alkaline properties, and dissolves camphor and the volatile oils.

PHARMACEUTICAL USES.—As an ingredient in the *Spiritus ammoniæ aromaticus*, the *Spiritus ammoniæ fœtidus*, and in the *Tinctura valerianæ ammoniata*.

MEDICAL PROPERTIES AND USES.—It is stimulant, diaphoretic and antispasmodic, chiefly used in languors, flatulent colic, and nervous debilities; saturated with camphor it forms a most highly stimulating liniment.

DOSE.—Half a drachm to a drachm.

AROMATIC SPIRIT OF AMMONIA.

Take of Spirit of Ammonia, two pints,
Essential Oil of Lemons, two drachms,
Nutmegs, bruised, half an ounce,
Cinnamon Bark, bruised, three drachms.

Macerate in a close vessel for three days, shaking occasionally; then distil a pint and a half.

REMARKS.—This preparation is very similar in its properties to the last, but is rendered much more agreeable both to the taste and smell, by the aromatics; to which, in addition to those directed in the former *Pharmacopiæ*, the cinnamon bark is now added.

PHARMACEUTICAL USES.—As an ingredient in the *tinctura guaiaci ammoniata*.

MEDICAL PROPERTIES AND USES.—See Spirit of Ammonia. It is very often given in combination with ethereal preparations.

DOSE.—Half a drachm to two drachms.

FŒTID SPIRIT OF AMMONIA.

Take of Spirit of Ammonia, two pints,
Assafoetida, an ounce and quarter.

Macerate in a close vessel for three days, shaking occasionally; then pour off the clear liquor, and distil a pint and half.

REMARKS.—This preparation is little more than a solution of the volatile oil of assafoetida in spirit of ammonia, for which a combination of the spirit of ammonia and tincture of assafoetida may be conveniently substituted in prescription. It is colourless, pungent, and fœtid, and by keeping becomes brownish.

MEDICAL PROPERTIES AND USES.—It is stimulant and antispasmodic, principally given in hysterical affections.

DOSE.—Half a drachm to two drachms.

COMPOUND SPIRIT OF ANISEED.

Take of Aniseeds bruised,
Angelica seeds, bruised, of each half a
pound,
Proof Spirit, a gallon.
Water, enough to prevent empyreuma:

Macerate for twenty-four hours, and distil a gallon.

REMARKS.—This is nearly the composition of the Irish usquebaugh, which is coloured yellow by saffron or green by sap green. Spirit of aniseed is also used in France sweetened with sugar, as a liqueur under the name of *Crème d'Anise*.

MEDICAL PROPERTIES AND USES.—It is an agree-

able and useful stomachic, and a good carminative in flatulent colic and similar affections.

DOSE.—Half a drachm to four.

COMPOUND SPIRIT OF HORSE RADISH.

Take of fresh Horse Radish root,
Dried Orange Peel of each, a pound,
Nutmegs, bruised, half an ounce.
Proof Spirit, a gallon,
Water sufficient to prevent empyreuma.

Macerate for twenty-four hours, and distil a gallon.

REMARKS.—This preparation is now introduced for the first time into this Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is an useful stimulant adjunct to infusion of foxglove or of juniper berries, in dropsies attended with debility.

DOSE.—One drachm to four.

SPIRIT OF CARAWAY.

Take of Caraway Seeds, bruised, a pound,
Proof Spirit, a gallon,
Water sufficient to prevent empyreuma.

Macerate for twenty-four hours, and distil a gallon.

REMARKS.—This spirit, sweetened with sugar, is drank in Germany as a dram.

MEDICAL PROPERTIES AND USES.—It is an effectual carminative, and an useful adjunct to griping purgatives.

DOSE.—One drachm to four.

SPIRIT OF CINNAMON.

Take of Cinnamon Bark, bruised, a pound,
Proof Spirit, a gallon,
Water sufficient to prevent empyreuma.

Macerate for twenty-four hours, and distil a gallon.

MEDICAL PROPERTIES AND USES.—It is an agreeable but heating cordial, and is used in languor and debility. Mr. Phillips very much overrates the dose which, he says is from two ounces to four.

DOSE.—One drachm to four.

COMPOUND SPIRIT OF JUNIPER.

Take of Juniper Berries, bruised, a pound,
Caraway Seeds, bruised,
Sweet Fennel Seeds, bruised, of each an
ounce and half.
Proof Spirit, a gallon.

Macerate for twenty-four hours, then add as much water as will prevent empyreuma, and distil a gallon.

REMARKS.—The properties and effects of this spirit coincide very nearly with those of gin.

MEDICAL PROPERTIES AND USES. It is diuretic, and is used as an adjunct to diuretic medicines, as foxglove, &c. in dropsy.

DOSE.—One drachm to four.

SPIRIT OF LAVENDER.

Take of fresh Flowers of Lavender, two pounds,
Proof Spirit, a gallon,
Water sufficient to prevent empyreuma.

Macerate for twenty-four hours, and then with a medium heat distil five pints.

REMARKS.—Mr. Brande says there is no necessity to resort to the recent flowers as above directed; for those which are carefully dried yield an equally fragrant product.

This spirit, diluted with water, and under various other forms, is sold as a perfume. The following recipe is given as one of the most approved used by perfumers:

Take of Rectified Spirit of Wine, five gallons.
Essential Oil of Lavender, twenty ounces.
————— Bergamotte, five ounces.
Essence of Ambergris half an ounce.
Mix.

USES.—It is only used pharmaceutically, to prepare the compound spirit of lavender and the compound camphor liniment; in both of which the essential oil might be substituted.

COMPOUND SPIRIT OF LAVENDER:

Take of Spirit of Lavender, three pints,
Spirit of Rosemary, a pint,
Nutmegs, bruised,
Cinnamon Bark, bruised, of each half an ounce,
Cloves, two drachms,
Red Saunders wood raspings, an ounce,

Digest for ten days, and then filter.

REMARKS.—This is rather a tincture than a spirit; it has a fine red colour, derived from the Saunders wood, and very agreeable odour; its taste is warm and stimulating.

MEDICAL PROPERTIES AND USES.—It is an useful stimulant and stomachic in languors and flatulency; or as an adjunct to stomachic infusions: is much used as a domestic restorative under the name of lavender drops, and is considered a sovereign remedy for low spirits.

DOSE.—Half a drachm to a drachm.

It may be conveniently taken dropped on a lump of sugar.

SPIRIT OF PEPPERMINT.

Take of Oil of Peppermint, *by weight*, half an ounce,
Rectified spirit, a gallon.

Add the spirit to the oil, and pour on them as much water as after the distillation may be sufficient to prevent empyreuma; then with a slow fire distil a gallon.

REMARKS.—This spirit, and the next, are now for the first time introduced into this Pharmacopœia, and are directed to be made with the essential oils instead of the dried herbs, as was formerly done: by the present mode of operating, which is more convenient, preparations of more equable strength and flavour are obtained.

The preparation which is sold under the name of Essence of Peppermint, is a solution of one part of essential oil of peppermint in three parts of Alcohol, and in doses of ten or twelve drops on a lump of sugar

is much used as a carminative; it is very often coloured green by spinach juice.

MEDICAL PROPERTIES AND USES.—It is stimulant and carminative, used in faintings and flatulence.

DOSE.—Half a drachm to two drachms.

SPIRIT OF SPEARMINT.

Take of Oil of Spearmint, *by weight*, half an ounce.
Rectified Spirit, a gallon.

Add the spirit to the oil, and pour on them as much water as will be sufficient, after the distillation, to prevent empyreuma; then with a slow fire distil a gallon.

REMARKS.—An essence of mint may be prepared as that of peppermint. A foreign liqueur, known by the name of Crème de Menthe, is made of brandy, oil of mint and sugar.—See the remarks on Spirit of Peppermint.

MEDICAL PROPERTIES AND USES.—Same as the last, as is also its dose.

SPIRIT OF NUTMEG.

Take of Nutmegs, bruised, two ounces,
Proof Spirit, a gallon.
Water sufficient to prevent empyreuma.

Macerate for twenty-four hours, and distil a gallon.

MEDICAL PROPERTIES AND USES.—It is cordial and carminative. This is an agreeable addition to carminative draughts or to griping purgatives.

DOSE.—One drachm to four.

SPIRIT OF PIMENTA.

Take of Pimenta Berries, bruised, three ounces,
Proof Spirit, a gallon,
Water sufficient to prevent empyreuma.

Macerate for twenty-four hours, and distil a gallon.

MEDICAL PROPERTIES AND USES.—It is cordial and carminative, used in flatulent colic and dyspepsia.

DOSE.—One drachm to four.

SPIRIT OF ROSEMARY.

Take of fresh tops of Rosemary, a pound and half,
Proof Spirit, a gallon.

Distil with a medium heat, five pounds.

Spirit of cinnamon, spirit of pennyroyal, and spirit of rosemary, may be obtained by adding to a gallon of proof spirit, instead of the herb, six scruples of its essential oil, and distilling the mixture in a proper apparatus by the application of heat.

REMARKS.—According to Mr. Brande, spirit of rosemary is a leading ingredient in most of the compounds called vulnerary or arquebuzade waters, and also in *Hungary water*, for the composition of which he gives the following as the *genuine recipe*:

Take of fresh Rosemary in blossom, four pounds.

—— Sage ————— eight ounces.

—— Ginger Root ——— two ounces.

Cut, bruise, and pour upon them twelve pints of rectified spirit, and two pints of water. Distil with a slow fire eleven pints.

MEDICAL PROPERTIES AND USES.—It is stimulant, and is almost limited to external use. M. Justamond recommends the following lotion in mammary abscesses:

℞ Ammoniae Muriatis unciam.
Spiritus Roris Marini Libram.—Misce.
To be applied on folds of lint.

Mr. Cooper speaks highly of the utility of this lotion in dispersing the induration remaining after the abscess. Spirit of rosemary is used pharmaceutically in the composition of the compound spirit of lavender, and of soap liniment.

Table shewing which of the officinal spirits are prepared with rectified spirit, and which with proof spirit in the present Pharmacopœia:

RECTIFIED SPIRIT IS EMPLOYED IN PREPARING	PROOF SPIRIT IS EMPLOYED IN PREPARING
Spiritus Ammoniae.	Spiritus Anisi Compositus.
——— Menthæ piperitæ.	——— Armoraciæ Composi-
——— Menthæ Viridis.	tus.
	——— Carui.
	——— Cinnamomi.
	——— Juniperi Compositus.
	——— Lavandulæ.
	——— Menthæ Pulegii.
	——— Nucis Moschatæ.
	——— Pimentæ.
	——— Rorismarini.

TINCTURES.

Tinctures are solutions obtained by infusion or digestion in Alcohol or proof spirit, of some of those prox-

imate principles of vegetable or animal matter which are soluble in those menstrua.

Tinctures are sometimes made with ether, but they are in general more strongly characterized by the nature of the menstruum than by that of the substance dissolved in it. The Edinburgh College directs an *Ethereal tincture of aloes*; and the *Spiritus etheris aromaticus* of the London Pharmacopœia is an ethereal tincture.

Very active substances, soluble in Alcohol, are those which are particularly adapted for tinctures, since they furnish preparations which are efficient in small doses, and are very manageable in extemporaneous prescriptions; such are the tinctures of *opium*, *digitalis*, &c. and *croton tiglium*. See p. 330.

The committee who arranged the *Codex Medicamentarius* of Paris have determined a question which was long doubtful; whether the addition of alkaline agents increases the extractive or solvent powers of the spirit.

They have ascertained that the reverse not unfrequently obtains: they found, for instance, that a smaller proportion of guaiacum was dissolved by the Spirit of ammonia than by Alcohol of the same strength, and that the quantity of matter dissolved from the root of valerian was the same in both cases.

Parmentier has proposed that one half only of the spirituous menstruum be added to the ingredients at first: and after digesting for six days, this part is to be poured off and the remainder added. In six more days the whole is to be strongly expressed, and the two portions of tincture mixed together. By this method he imagines more of the active principles of the ingredients are extracted, and the tinctures obtained of a more uniform strength.—*Annales de Chimie*, lxii. p. 40.

Instead of being poured off or filtered at the end of the prescribed time, they are sometimes, through carelessness, suffered to remain upon the dregs, and portions

from time to time decanted off for use, so that at different times their strength varies; a circumstance which in some of them might be productive of unpleasant if not serious consequences.

Pure Alcohol is required in a very few instances only, for the formation of tinctures, proof spirit being sufficient for almost every purpose. The dilution of the spirit, however, must be varied according to the known principles of the substance to be submitted to its action: when resin predominates, the spirit must necessarily be more concentrated; where gum resin or extractive are the most abundant constituents, proof spirit must be employed:

In the preservation of tinctures, uniformity of temperature is of some importance, and hence a cellar is the fittest place in which to keep them in store.

TINCTURE OF ALOES.

Take of Socotorine Aloes, powdered, half an ounce,
Extract of Liquorice, an ounce and a half,
dissolved in eight ounces of water.

Proof Spirit, *by measure*, eight ounces.

Digest for seven days, and then filter.

REMARKS.—The liquorice is added here to assist in suspending the aloes in the spirit and to cover its nauseous taste, which it does better than any other adjunct, though not entirely.

MEDICAL PROPERTIES AND USES.—It is stomatic and purgative. This, as well as the other aloetic preparations, have long been considered as effectual emmenagogues, which intention they often successfully accomplish by the effect which they produce on the

rectum, and so by contiguous sympathy upon the uterus itself; but for this purpose, as a fluid preparation, the compound decoction is to be preferred. See also extract of aloes.

Dose.—Half a drachm to two drachms.

COMPOUND TINCTURE OF ALOES.

Take of Tincture of Myrrh, two pints,
Socotorine Aloes in powder, three ounces.

Macerate for fourteen days, and then strain.

REMARKS.—This preparation is stronger and more nauseous than the former; it resembles much in its composition the Elixir Proprietatis of the older physicians; that of Paracelsus contained sulphuric acid, and that of Boerhaave vinegar. In the former Pharmacopœia saffron was added to this preparation, which only unnecessarily added to the expense.

MEDICAL PROPERTIES AND USES.—It is purgative and emmenagogue, used in languid cold habits to open the bowels, and in chlorosis.

Dose.—Dose half a drachm to two drachms.

TINCTURE OF ANGUSTURA.

Take of Angustura Bark, coarsely powdered, two
ounces,
Proof Spirit, two pints.

Macerate for fourteen days, and then filter.

REMARKS.—A false Angustura bark is sometimes met with, which in some respects resembles the genuine,

but possesses the most deleterious qualities. It is placed by Orfila in the same class of poisons as the *nux vomica*, *fabæ Sancti Ignatii*, &c.

Planche has examined it, and named it *Angustura Ferruginea*. It is the bark of the *Brucea Antidysenterica*, and by the experiments of MM. Pelletier and Caventou, its poisonous qualities are shewn to depend on a peculiar alkaline principle which they named *Brucine*, the effects of which on the animal economy are similar to those of *Strychnine*, with which it is found combined in the *Nux Vomica*.

This false *Angustura* may be distinguished from the true bark, by its nauseous and intensely bitter taste when chewed; by its greater thickness and weight, by being in shorter and less regular pieces; internally it is nearly black, and externally it is covered with a warty rust-coloured epidermis. By agitating the powder in very dilute muriatic acid, it assumes a beautiful green, colour, owing to the iron contained in the epidermis.

MEDICAL PROPERTIES AND USES.—It is a good tonic and stomachic, more stimulant than the bark itself; it expels flatus and increases the appetite for food.

DOSE.—One or two drachms.

TINCTURE OF ASSAFŒTIDA.

Take of Assafœtida, four ounces,
Rectified Spirit, two pints,
Water, half a pint.

Add the spirit to the assafœtida previously triturated with the water, macerate for fourteen days, and filter.

MEDICAL PROPERTIES AND USES.—It may be given with advantage in hysterical affections, but if mixed

with water a precipitation of the resinous matter takes place, hence the necessity of using rectified spirit in preparing the tincture.

Dose.—One or two drachms.

TINCTURE OF ORANGE PEEL.

Take of Orange Rind, three ounces,
Proof Spirit, two pints,

Digest for three days, and filter.

REMARKS.—The above formula, which should have been inserted here as in the former edition of this Pharmacopœia, has been omitted, I presume, unintentionally; I have therefore thought it right to supply the deficiency, as it is subsequently directed as an ingredient in other formulæ. See *Mistura ferri aromatica*.

In making this tincture, care should be taken to exclude the white or mucilaginous part of the fruit; when made with the dried peel, two ounces of it are equivalent to three of the fresh.

MEDICAL PROPERTIES AND USES.—It is an excellent stomachic, and as it is not decomposed by water, may be added to infusions and other aqueous solutions.

Dose.—One, two, or three drachms.

TINCTURE OF BALSAM OF TOLU.

Take of Balsam of Tolu, an ounce,
Rectified Spirit, a pint.

Digest in a close vessel until the resin is dissolved, and filter.

REMARKS.—This tincture also is decomposed by water, and when ordered in prescription in aqueous vehicles, should be triturated with mucilage or some viscid liquor previous to the addition of the water, in order to suspend the resinous precipitate.

MEDICAL PROPERTIES AND USES.—It is a stimulating expectorant, and should not be given where pulmonary affections are accompanied by inflammation. It is chiefly used as an adjunct, and forms an elegant addition to cough mixtures. The following is recommended in obstinate coughs devoid of inflammatory symptoms:

℞ Tinct. Balsam. Tolut. ℥ ii.
Mucilag. Gum. Arab. ℥ i.
Aquæ Distillatæ ℥ ivss.
Tinct. Camph. Comp. ℥ iii.
Syrup. Tolutani ℥ iii.
Cochlearea duo subinde urgente tussi.

DOSE.—Half a drachm to two drachms.

COMPOUND TINCTURE OF BENZOIN.

Take of Benzoin, three ounces,
Purified Styrax, two ounces,
Balsam of Tolu, an ounce,
Socotorine Aloes, half an ounce,
Rectified Spirit, two pints.

Digest for seven days, and filter.

REMARKS.—This tincture is also decomposed by water, (see Tincture of Balsam of Tolu.) It is the balsamum traumaticum of the old Pharmacopœias, and is similar to some very complicated remedies known by

different names, as Baume de Commandeur, Jesuit's Drops, &c.

MEDICAL PROPERTIES AND USES.—It is stimulant, expectorant, and antispasmodic. It is but little used internally, but is sometimes given in chronic catarrh and asthma. Under the name of Friars' Balsam it is a popular, but very injudicious application to fresh wounds, which it prevents from healing by the first intention.

DOSE.—From half a drachm to two drachms.

TINCTURE OF CAMPHOR OR CAMPHORATED SPIRIT.

Take of Camphor, an ounce,
Rectified Spirit, half a pint.

Mix so as to dissolve the camphor.

REMARKS.—Water decomposes this tincture, and precipitates the camphor; and the tincture undiluted is too strong for internal use.

MEDICAL PROPERTIES AND USES.—It is stimulant and discutient; but for the reason above given it is only used externally in chilblains, rheumatism, and numbness.

TINCTURE OF CANTHARIDES.

Take of Cantharides, in powder, two drachms,
Proof Spirit, a pint and half,

Digest for seven days, and filter.

REMARKS.—In the former Pharmacopœia, cochineal was added to this preparation, which is now omitted as only adding uselessly to the expense.

MEDICAL PROPERTIES AND USES.—Stimulant and diuretic. The internal use of this medicine requires much caution; its advantages are doubtful, and its effects violent. It is used in gleet and leucorrhœa, and is said to have produced good effects in ovarian dropsy, by its diuretic powers: it has been administered in whooping cough, and in one case, of which I was informed, with great success: it was thus given to an infant:

℞ Tincturæ Cinchonæ ℥ iv.

———— Cantharidis ℥ iii.

———— Opii Camph. ℥ ss.

Sumat cochleare parvum ex cochleare magno infusi lini ter die.

A compound tincture of cantharides and capsicum is used in France as a rubefacient, to be applied by friction to paralyzed limbs.—See Virey, vol. i. p. 449.

The American writers on midwifery extol this medicine very highly as an emmenagogue.

Dr. A. T. Thomson recommends its application to frost bitten parts.

An overdose of it is highly poisonous, and may produce a train of the most frightful symptoms terminating in death; *as antidotes* we should give oil to favour vomiting, milk, syrups, decoctions of linseed or mallows, and draughts containing musk, opium, or camphor; we should also inject some bland fluid, as the decoctions above mentioned, into the bladder, and rub the spine with volatile liniments and laudanum.

DOSE.—Ten drops to a drachm.

TINCTURE OF CAPSICUM.

Take of Capsicum Pods, an ounce,
Proof Spirit, two pints.

Macerate for fourteen days, and filter.

REMARKS.—This tincture is now for the first time introduced into this Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is highly stimulant, and is used in the low stage of typhus, Cynanche maligna, or gangrenous sore throat. It is recommended by Dr. Copland to correct the nausea which oil of turpentine is apt to produce: from one drachm to two in six ounces of barley water or other fluid constitutes a good stimulating gargle. Lozenges of capsicum are now in use, and are a convenient mode of taking the medicine.

DOSE.—From ten drops to a drachm.

COMPOUND TINCTURE OF CARDAMOM.

Take of Cardamom Seeds, husked and bruised,
Caraway Seeds, bruised, of each two drachms,
Cinnamon Bark, bruised, half an ounce,
Proof Spirit, two pints.

Macerate for fourteen days, and then filter.

REMARKS.—In the former Pharmacopœia, there was also a simple tincture of cardamom ordered, and cochineal was added to this preparation, but is now omitted as being expensive and in no way contributing to the efficacy of the tincture. The London College add raisins, to render the taste more agreeable: cardamoms are said to form a leading ingredient in the well known *Balm of Gilead*.

There are three species of cardamoms met with, which are known by the names of great, lesser, and small, which appear to be varieties obtained from the

same plant, but differing only in their size.—*Richard Botanique Medicale.*

MEDICAL PROPERTIES AND USES.—It is stomachic and carminative, generally employed as an adjunct to bitter stomachic infusions, and to correct the effects of cold or griping purgatives.

DOSE.—One drachm to four.

TINCTURE OF CASCARILLA.

Take of Cascarilla Bark, coarsely powdered, four ounces,
Proof Spirit, two pints.

Macerate for seven days, and then filter.

MEDICAL PROPERTIES AND USES.—It is tonic and stomachic, and is used as an adjunct to stomachic infusions.

DOSE.—One or two drachms.

TINCTURE OF CASTOR.

Take of Russian Castor, powdered, two ounces,
Proof Spirit, two pints.

Macerate for seven days, and then filter.

REMARKS.—Rectified spirit, as ordered by the other colleges, would be preferable as a solvent in this preparation, the active parts of the subject being resin and a volatile oil, besides which the tincture made with Alcohol has a more agreeable flavour.

The peculiar substance here used is an animal pro-

duct secreted by the *Castor fiber*, or beaver, in bags near the rectum.

In the former Pharmacopœia there was also directed a tincture of Canadian castor, which is superfluous, as the Russian is much to be preferred, and may be distinguished from the other by being larger, rounder, heavier, and less corrugated on the outside.

Dr. A. T. Thompson says, that when this tincture is made with Russian castor, if a few drops of it be dropped into distilled water, a milky mixture is produced, which is again cleared and completely decolorized by the addition of ammonia : but no such effect is produced if the tincture be made with Canadian castor.

MEDICAL PROPERTIES AND USES.—Antispasmodic, an useful addition to hysteric combinations, and seems to act more particularly on the uterine system. According to Dr. Paris, tincture of castor combined with camphor and opium, flavoured with aniseeds and coloured by cochineal, constitutes *Bateman's Pectoral Drops*.

DOSE.—Half a drachm to three drachms.

TINCTURE OF CATECHU.

Take of Catechu, three ounces,
Cinnamon Bark, bruised, two ounces,
Proof Spirit, two pints.

Macerate for seven days, and filter.

REMARKS.—This is the *tinctura japonica* of the older Pharmacopœias.

MEDICAL PROPERTIES AND USES.—It is a very grateful and efficacious astringent, and as such may be combined advantageously with the chalk mixture, in chronic dysentery, diarrhœas, &c. Catechu is also used

in the form of lozenges, and in this form is productive of advantage in relaxation of the uvula and fauces.

DOSE.—One or two drachms in wine or chalk mixture.

TINCTURE OF BARK.

Take of Lance-leaved Cinchona Bark, coarsely powdered, four ounces,
Proof Spirit, two pints.

Digest for seven days, and filter,

REMARKS.—The quantity of the active principle of the bark taken up in this tincture, bears so small a proportion to the quantity of the menstruum employed, that it cannot be given so as to produce the effects of the bark. According to Chereau and Robiquet, whose opinions are grounded on the experiments of Pelletier and Caventou, this tincture should be made with strong Alcohol, by which the active principle of the bark is more completely taken up.

I do not understand what Dr. Paris means by saying that this tincture should not be kept in a very cold place, as a low temperature precipitates the *Morphia*, but that this inconvenience may be obviated by the addition of a little acetic acid, which does not diminish the efficacy of the tincture.—*Pharmacologia*, seventh edition, p. 474.

MEDICAL PROPERTIES AND USES.—It is used chiefly as an adjunct to the infusion or decoction.

DOSE.—One drachm to four.

COMPOUND TINCTURE OF BARK.

Take of Lance-leaved Cinchona Bark, coarsely powdered, two ounces,
Orange Peel, dried, half an ounce,
Virginia Snake-root, bruised, three drachms,
Saffron, a drachm,
Cochineal, in powder, two scruples,
Proof Spirit, by measure, twenty ounces.

Macerate for fourteen days, and filter.

REMARKS.—This is said to be similar in composition to a preparation which acquired much celebrity under the title of *Huxham's Tincture of Bark*. It contains less of the active principle of the bark than the simple tincture, but is rendered more grateful by the aromatics.

MEDICAL PROPERTIES AND USES.—It is tonic and stomachic; Huxham gave it in intermittents and low nervous fevers, combined with ten or fifteen drops of elixir of vitrol, or acidum sulphuricum aromaticum of the present Pharmacopœia.

DOSE.—One drachm to four.

TINCTURE OF CINNAMON.

Take of Cinnamon Bark, bruised, three ounces and a half,
Proof Spirit, two pints.

Macerate for fourteen days, and then filter.

REMARKS.—In the former Pharmacopœia, a compound tincture of cinnamon was directed, which is now omitted as superfluous.

MEDICAL PROPERTIES AND USES.—It is astringent and stomachic; it is used as an adjunct to chalk mixture and astringent infusions in chronic dysentery and diarrhœa.

DOSE.—One drachm to three or four.

TINCTURE OF THE SEEDS OF MEADOW-SAFFRON.

Take of the seeds of the Meadow Saffron, two ounces.
Proof Spirit, a pint.

Macerate for fourteen days, and filter.

REMARKS.—This tincture is now introduced for the first time into this Pharmacopœia, and is not ordered by either the Edinburgh or London College: the latter orders an ammoniated spirit of colchicum prepared from the seeds, which however is not a convenient formula, as it is often desirable to omit the ammonia. The use of the seeds in making the vinous infusion or tincture instead of the bulb, as possessing the virtues of the latter without many of its objectionable qualities, has been lately recommended, particularly by Dr. Williams of Ipswich. The tincture, so prepared, has as great and as certain a remedial influence as the bulb, whilst it is less liable to purge and nauseate. According to MM. Pelletier and Caventou, colchicum owes its activity to the presence of *Veratrine*, one of those recently discovered substances called alkaloids; the same alkaline base exists also in the white hellebore, and “it is worthy of remark” says Dr. Duncan, “that before the principle upon which their activity depends, was known, the white hellebore and meadow saffron should have each respectively been suspected to be the active ingredient in the Eau Medicinale, by Mr. Moore and Mr. Want. The

discovery of Veratrine in both is a strong presumption that the virtue of the Eau Medicinale d'Husson, really depends upon that alkaloid from whatever plant it be prepared."

The *Eau Medicinale*, so celebrated for the cure of gout, is now known to be a vinous infusion of colchicum, and Dr. Paris gives the following as the receipt for preparing it. "Take two ounces of the root (*bulb*) of colchicum, cut into slices, macerate in four fluid ounces of Spanish wine, and filter."

The seeds should be gathered in the latter end of June or the beginning of July, carefully dried and kept in a dry place. They should not be bruised, as their virtues reside chiefly in the husk or cortical part.

Veratrine is extremely soluble in Alcohol; the active properties of the plant will therefore be readily taken up in considerable quantity in this tincture.

MEDICAL PROPERTIES AND USES.—It is diuretic, cathartic, and narcotic. It acts chiefly on the bowels and nerves, and diminishes the action of the arterial system. This, as well as the other preparations of colchicum, have acquired great character in the treatment of rheumatism and gout, for the cure of which disorders Dr. Scudamore, in his Treatise on the subject, particularly recommends the *Acetum Colchici* (which see.) The action of colchicum seems also particularly directed to mucous surfaces; and Dr. Armstrong recommends its administration in laryngitis and bronchitis; in the latter disease, combined with purgatives, as in the following formula, he considers it a most valuable remedy, acting simultaneously on the bowels and skin.

Infusi Sennæ $\frac{3}{4}$ iss.

Sulph. Magnes. 3 i.

Mannæ 3 i.

Pulv. Colchici gr. v. Bis terve die sumendus.

Dr. Chisholm has related a case in which vinum colchici caused the expulsion of tape worm, after the failure of all other remedies. It has been much used in the cure of dropsies, particularly hydrothorax. Dr. Williams attributes considerable tonic effects to the seeds, and says, that "unlike other narcotic remedies, they do not appear to produce or favour congestion in the head." He also speaks highly of its efficacy and safety in those distressing pains in the back, loins, or chest, which arise from deranged action of the uterus, and in those anomalous pains to which young females are subject prior to puberty. Dr. Wilson Philip says he has found the tincture of colchicum given in doses of from five to ten minims three times a day, frequently very serviceable in the *early* stages of phthisis pulmonalis, by allaying the cough and relieving the febrile exacerbations.

DOSE.—Ten drops to sixty.

TINCTURE OF COLOMBA.

Take of Colomba, sliced, two ounces and a half,
Proof Spirit, two pints.

Macerate for fourteen days, and filter.

MEDICAL PROPERTIES AND USES.—This is a valuable tonic and stomachic, and being compatible with solutions of iron, may be advantageously given in combination with them; it also agrees better with the stomach than the root or the infusion.

DOSE.—One drachm to three or four.

TINCTURE OF HEMLOCK.

Take of Hemlock Leaves, dried, two ounces,
Cardamom Seeds, bruised, an ounce,
Proof Spirit, a pint.

Macerate for seven days, and filter.

REMARKS.—This tincture was not directed in the former Pharmacopœia, nor is it introduced into that of the London College. It is ordered in the last edition of the Edinburgh Pharmacopœia.

MEDICAL PROPERTIES AND USES.—This tincture is a very elegant and efficient form for the administration of hemlock, as its active principle *Conein*, being perfectly soluble in spirit, is thereby taken up. Its effects will of course be those of the hemlock itself, narcotic, sedative, and anodyne. It is given with effect in different species of cancer, particularly of the uterus, the suffering from which it alleviates. See also inspissated juice of hemlock.

DOSE.—Half a drachm to a drachm.

TINCTURE OF DIGITALIS.

Take of the leaves of Purple Foxglove, (rejecting the larger ones,) dried and coarsely powdered, two ounces.

Proof Spirit, a pint.

Macerate for seven days, and filter.

REMARKS.—This is a very powerful medicine, strongly impregnated with the virtues of foxglove in a very manageable form. The active principle of the foxglove

discovered by M. Le Royer, and named *digitalia* or *digitaline*, being very soluble in both water and Alcohol, the virtues of the foxglove will, of course, be freely imparted to this tincture.

A. Richard has given in the Dictionary of Drugs, a condensed account of the observations of those chemists who have attempted to isolate the narcotic principle of foxglove; he is of opinion that the *digitalia* of M. Le Royer may be composed of various principles, all soluble in ether.

The larger leaves are ordered to be rejected on account of their inferiority of colour, less bitter taste, and, for these reasons, probably containing less of the active principle of the plant.

The gathering and preserving of the leaves intended for medical use is a matter of importance. They should be gathered when the plant is in flower, and in the second year of its growth; those which bear the largest and deepest coloured flowers should be selected, as being the most powerful; the floral leaves are also to be preferred for the reasons already assigned; they should then be carefully dried until they become crisp, and perhaps the best mode for doing this would be to press them between folds of paper, as in preparing plants for a *hortus siccus*; they should never be tied in bundles, and so hung up to dry, as is too often done, for by these means they are apt to ferment, and the parts least exposed become rotten. The powder should be kept in well stopped opaque bottles, and kept from the action of either light or air.

MEDICAL PROPERTIES AND USES.—It is diuretic and sedative; as a diuretic, *digitalis* acts by diminishing arterial action, and so increasing that of the absorbents, by which means diuresis is promoted; with this intention *digitalis* is given in ascites and other kinds of dropsy, particularly in hydrothorax, some of the most

distressing symptoms of which it palliates independently of its diuretic effects. It is best administered in conjunction with other diuretics, as squill or nitrous spirit of ether, see page 373. If it purge or vomit, its diuretic effects are greatly impaired.

As a sedative it acts more directly than any remedy we are acquainted with, possessing great power in controlling the action of the heart and diminishing the impetus of the blood, on which account it is beneficially administered in aneurism and in hæmorrhages, particularly those from the lungs or uterus. Its effects in phthisis were much vaunted, but experience has not confirmed its utility in this complaint. The change made in the pulse by its use is very remarkable. Dr. Baidon informs us, that he reduced his own pulse from 110 to 40 by the use of digitalis, taken by gradually increased doses to the extent of six grains in the day. The late Dr. Halloran, of Cork, speaks very highly of its effects on persons afflicted with mania, for which he gave the tincture in doses of 60 to 120 drops three times a day; and the correctness of his observations have since been confirmed by the experience of others. In cases where there appears to be some organic affection of the heart or large vessels, the most decided benefit has resulted from its use.

The effects produced in some constitutions by the use of digitalis are so remarkably violent, that its administration demands our utmost circumspection and attention to the state of the patient; and should there occur intermission of the pulse, vertigo, indistinct vision or nausea, with vomiting or purging, we should immediately discontinue the medicine, as its further administration under such circumstances, will almost certainly give rise to a train of the most alarming symptoms, terminating in death.

The effects of an overdose are best counteracted by the administration of cordials, as brandy and water with

tincture of opium, or aromatic confection, mint tea, &c., and the application of a blister to the pit of the stomach.

Dose.—Ten drops *cautiously* increased to forty.

TINCTURE OF GALBANUM.

Take of Galbanum, cut very small, two ounces,
Proof Spirit, two pints.

Digest for seven days, and filter.

MEDICAL PROPERTIES AND USES.—It is stimulant and antispasmodic, and is used for the same purposes as assafoetida, than which it is less nauseous and less powerful.

Dose.—One drachm to three.

TINCTURE OF GALLS.

Take of Galls, powdered, four ounces,
Proof Spirit, two pints.

Digest for seven days, and filter.

REMARKS.—As the virtues of the galls depend much on their quality, this should be attended to. The best galls come from Aleppo and Smyrna, and these are small, heavy, and of a deep bluish grey or olive colour; their surface is tubercular, and their taste extremely astringent and somewhat bitter. They are brittle, break with a dense flinty fracture, and display a compact striated texture. Those of an inferior quality are lighter in weight, and of a white or reddish hue, and when broken are pulverulent and hollow, the insect (the *cynips quercusfolii*) having eaten its way out, before which pe-

riod they should have been gathered, as their astringent qualities are much injured thereby. This tincture was first introduced by the Dublin College into their Pharmacopœia:

MEDICAL PROPERTIES AND USES.—It is a powerful astringent: as the spirit dissolves the tannin, which is the chief active constituent of the galls, the tincture possesses all their astringent power. It is given in intestinal hæmorrhage, protracted diarrhœa, and dysentery. An inconvenience attends this preparation, that after some time a deposit takes place, by which its properties are impaired.

DOSE.—One drachm to three.

COMPOUND TINCTURE OF GENTIAN.

Take of Gentian Root, sliced and bruised, two ounces,
Seville Orange Peel, dried, an ounce,
Cardamom Seeds, husked, half an ounce,
Proof Spirit, two pints.

Macerate for fourteen days, and filter.

REMARKS.—MM. Henry and Caventou have separated from gentian its bitter active principle in the form of an alkaloid, which has been named *Gentianine*. It is said to concentrate within itself all the virtues of the gentian root, and being very soluble in alcohol will impart these virtues to this tincture.

MEDICAL PROPERTIES AND USES.—It is tonic, and an excellent and grateful stomachic bitter, and is a valuable adjunct to the Infusum gentianæ compositum and other stomachic infusions: a very elegant mode of administering it is in the form of an effervescing mixture, as in the following formula:

R Carbonatis Sodæ ℥ iii.

Aquæ uncias sex.

Tinct. Gentianæ Comp. ℥ iii.

Sumat cochlearea duo magna cum uno succi
limonis inter effervescendum.

In France a tincture and a syrup of gentianine are used; the latter is composed of,

Simple Syrup, a pound.

Gentianine, sixteen grains.—Dose ℥ ss. to ℥ i.

It is said to be one of the best bitters that can be prescribed in scrofulous affections, and the tincture is made by dissolving five grains of gentianine in one ounce of alcohol.

DOSE.—Half a drachm to three drachms.

TINCTURE OF GUAIAACUM.

Take of Guaiacum, four ounces,

Rectified Spirit, two pints.

Macerate for seven days, and filter.

REMARKS.—This tincture is decomposed by water, with which it forms a very ungrateful mixture, from the copious precipitation of its resinous matter.

MEDICAL PROPERTIES AND USES.—It is stimulant, sudorific, and laxative. Guaiacum has been long extolled as a remedy for rheumatism, and enters into the composition of most of the popular and empirical cures for that disorder, among the rest is one known by the name of the *Chelsea Pensioner*, by which Lord Amherst was cured; the following is said to be its composition :

R Gum Guaiaci ℥ i.
 Bitart. Potassæ ℥ i.
 Sulphuris Sublim. ℥ ii.
 Pulv. Rhei ℥ vi.
 Zingiberis ℥ ss.
 Nucis Moschatæ ℥ ii.
 Mellis Despumati ℥.
 Misce et sumat cochlearea duo mediocria ante
 cubitum et idem mane.

Guaiacum at one time enjoyed great reputation as a specific in the cure of syphilis: according to Dr. Paris, it was imported into Europe in 1517, and gained immediate celebrity from curing the celebrated Van Hutten. Guaiacum still forms one of the constituents used in the preparation of the *decoction of sweet woods*, as it is called, on which much reliance is placed by some in the cure of certain secondary venereal affections.

DOSE.—One drachm to four in mucilage or some viscid fluid.

AMMONIATED TINCTURE OF GUAIIACUM.

Take of Guaiacum, four ounces,
 Aromatic Spirit of Ammonia, a pound and a
 half,

Macerate for seven days, and filter.

REMARKS.—This tincture also is decomposed by water, and the guaiacum separated in dark curdy flakes; but Dr. Paris says, that “if equal parts of quicklime and powdered guaiacum be rubbed together, and a quantity of water be poured over them, and the mixture allowed to stand until it becomes fine, we shall obtain a solution of this substance, which will mix in any proportion with

aqueous vehicles without decomposition, and to which the aromatic spirit of ammonia may be subsequently added with effect. The same writer remarks, that nitrous acid and the spirit of nitric ether occasion an extraordinary decomposition of these tinctures, separating the guaiacum into coagulated masses, and imparting to the whole an intense bluish green colour: chlorine, he says, he found to have the same effect: but the sulphuric and muriatic acids produce no disturbance, although all acids and acidulous salts must be considered as incompatible with these tinctures.—*Pharmacologia*, vol. ii. p. 471, seventh edition.

MEDICAL PROPERTIES AND USES.—This tincture is more efficacious as a stimulating sudorific, and better adapted to chronic rheumatism than the former, as the ammonia coincides with the operation of the guaiacum. Milk is a convenient vehicle for taking this medicine.

DOSE.—Half a drachm to two drachms.

TINCTURE OF BLACK HELLEBORE.

Take of Black Hellebore Root, coarsely powdered,
four ounces,
Proof Spirit, two pints.

Macerate for seven days, and filter.

REMARKS.—From the experiments of MM. Feneulle and Capron, it appears that the active principle of the black hellebore is not an alkali like that of the white hellebore, (*veratrum*,) they have also shewn that it contains a very abundant resinous principle; for which reason proof spirit is not proper for making this tincture, which should be prepared with rectified spirit.

Hellebore is one of the most ancient articles in the

Materia Medica: Ctesias, who lived in the time of Plato, and anterior to Hippocrates, speaks of it as a medicine of important virtues. It was called *Melampodium*, because it was said to have been first used by a shepherd named Melampus, in the treatment of the frantic daughters of Prætus. *Dioscorides*, book 4, ch 151.

MEDICAL PROPERTIES AND USES.—Preparations of black hellebore have been long esteemed as emmenagogue remedies, and as such Dr. Mead recommended this tincture in uterine obstructions, but its use requires great caution, and its effects are uncertain. It is said to have been administered with benefit in melancholy and mania, for the cure of which, a species of this genus, according to Wildenow, the *helleborus orientalis* had great reputation among the ancients, as appears from their writings. Pliny says, lib. 25, cap. 5, *nigrum helleborum medetur paralyticis, insanientibus, trahit alvum et bilem pituitasque*. And Horace also mentions the same effect. Sat. lib. 11. Sat. 3.

Dum doceo insanire omnes, vos ordine adite.

Danda est ellebori multo pars maxima avaris :

Nescio an Anticyram ratio illis destinet omnem.

The roots of the poisonous *aconitum neomontanum* are often fraudulently substituted for those of hellebore : they may be detected by their colour, which is much lighter than that of the hellebore.

DOSE.—From thirty drops to sixty.

TINCTURE OF HOPS.

Take of the Strobiles of the Hop dried, five ounces,
Proof Spirit, two pints.

Macerate for fourteen days, frequently shaking, and filter.

REMARKS.—This tincture is now ordered for the first time in this Pharmacopœia. Hops are so very light and bulky, that they absorb and retain a great deal of the spirit even when subjected to compression; but by thoroughly drying, and then powdering them, the tincture may be prepared without much loss. Dr. A. W. Ives has shewn that the characteristic fragrance and bitterness of hops reside in an impalpable yellow pulverulent substance, forming not more than one sixth of their weight, and easily separable from them by sifting. This substance, which is peculiar to the female plant, he has named *Lupuline*; it is not an immediate principle, but an organic compound of tannin, extractive, bitter principle, wax, resin, and lignin. See also Extract of Hops.

MEDICAL PROPERTIES AND USES.—It is used as a mild narcotic and tonic, deriving its properties from the *Lupuline*, of which it may be regarded as an alcoholic solution. As a sedative it may, perhaps, be useful in habits with which opiates disagree; but the effects of hops on the animal economy have not been ascertained, with sufficient accuracy, to warrant us in attaching much importance to their use as a medicine.

DOSE.—Half a drachm to three drachms.

TINCTURE OF HENBANE.

Take of Henbane Leaves, dried, five ounces,
Proof Spirit, two pints.

Digest for seven days, and filter.

REMARKS.—The active principle of the *hyoscyamus niger*, has been ascertained by MM. Meissner and Brandes to be a peculiar alkaline salt, which they have

named *Hyosciamia*, which is said to differ from all the other vegetable alkalies, in being able to resist a low red heat, without undergoing decomposition. Henbane has long been in medical use; it is mentioned by Dioscorides, who attributes to it an intoxicating power; and the *anodyne necklaces* still in use to allay the irritation of teething, which are made of the roots of henbane, are a remnant of a very ancient superstition.

MEDICAL PROPERTIES AND USES.—It is narcotic and anodyne; it is a more efficacious substitute for opium than the tincture of hops, and is free from the ill effects which opium often produces, of disturbing the head and constipating the bowels: Henbane, on the contrary, has a tendency to relax them; this effect if excessive, may be corrected by the addition of a small quantity of opium or laudanum. It is used with benefit in painful and spasmodic affections, hysteria, rheumatism, and gout, inflamed piles, &c.; added to cough mixtures it allays the irritation of obstinate coughs, particularly those attending on asthma.

DOSE.—Fifteen drops to a drachm or two.

TINCTURE OF JALAP.

Take of Jalap Root, powdered, eight ounces,
Proof Spirit, two pints.

Macerate for fourteen days, and filter.

REMARKS.—The strength of this tincture is greater than in the former Pharmacopœia, in which only five ounces of the powdered root were used, and digestion for seven days was directed: as the activity of jalap resides not in one principle only, but in several, resin, gum, and extractive, proof spirit is its best solvent, and

the tincture is impregnated with all the powers of the root.

MEDICAL PROPERTIES AND USES.—It is actively cathartic, it is not however administered alone, but as an adjunct to purgative combinations.

DOSE.—One drachm to four.

TINCTURE OF KINO.

Take of Kino, in powder, three ounces.

Proof Spirit, two pints.

Macerate for seven days, and filter.

REMARKS.—There is a good deal of obscurity with regard to the history of the substance employed to form this tincture. In the former edition of this Pharmacopœia, it was set down as a product of the *Butea frondosa*; in the present edition no source is assigned; but it seems satisfactorily proved, that the plant which produces it is the *Pterocarpus erinacea*. This tincture is not ordered by the other Colleges, and appears to be a very unnecessary formula.

MEDICAL PROPERTIES AND USES.—It is an active astringent, containing tannin in solution, and is given to check internal hæmorrhages, diarrhœas, and other excessive discharges, but catechu is generally preferred as more certain in its operation.

DOSE.—One or two drachms.

TINCTURE OF MUSK.

Take of Musk in powder, two drachms.

Rectified Spirit, a pint.

Digest for seven days, and filter.

Musk has been long regarded as a valuable stimulant antispasmodic, but it is to be feared that the effects attributed to it have been overrated: the powder is the most eligible form for its administration.

MEDICAL PROPERTIES AND USES.—Stimulant and antispasmodic. Musk is much used in hysteria, pertussis, and epilepsy; in the latter disease Dr. A. T. Thomson mentions having seen it, when given to the extent of half a drachm three times a day, stop the fits in an old and confirmed case, for three months; the tincture is not an efficient mode of administering the medicine, owing to the small proportion which the musk bears to the menstruum, each drachm of the tincture being prepared with less than one grain of the substance.

DOSE.—One drachm to four.

TINCTURE OF MYRRH.

Take of Myrrh, bruised, three ounces,
Proof Spirit, a pint and half,
Rectified Spirit, half a pint.

Digest for seven days, and filter.

REMARKS.—Myrrh being principally resinous, is not entirely soluble in proof spirit, and therefore Alcohol less diluted is ordered for its solution. The addition of water to this tincture will of course cause a precipitation.

MEDICAL PROPERTIES AND USES.—It is tonic, deobstruent and expectorant, and is much relied on as an emmenagogue; if given with this intention the *Pilula Aloes c Myrrhâ* is an excellent form. The tincture is not much given internally; externally it is used as an

application to foul sores, or diluted with water, as a wash for spongy gums ; it is an ingredient in most of the dentifrice tinctures.

Dose.—Half a drachm to a drachm.

TINCTURE OF NUX VOMICA.

Take of the Seeds of the *Strychnos Nux Vomica*,
scraped, two ounces,
Rectified Spirit, eight ounces.

Macerate for seven days, and filter.

REMARKS.—The preparations of *Nux vomica* have been now for the first time introduced into this Pharmacopœia, and do not appear in those of London or Edinburgh. The *strychnos nux vomica* is a native of the coast of Coromandel and other parts of India. It belongs to the class pentandria, order monogynia, and is included in the fourth section of the natural order *Apocineæ*. M. Jussieu and M. de Candolle have proposed to establish a new family distinct from the *Apocineæ*, of which the genus *strychnos* should be the type ; but the characters of the genera which would be thus united are too imperfectly known to justify us in adopting this new order.—*Richard, Botanique Medicale*, page 323:

“ Its fruit is a berry, round, smooth, of the size of a pretty large apple, covered with a smooth somewhat hard shell, of a rich beautiful orange colour ; when ripe filled with a soft jelly like pulp. The seeds, from two to five in number, are immersed in the pulp of the berry. The root is used by the natives to cure intermittent fevers and the bites of venomous snakes ; the seeds are employed in the distillation of spirits to render them more intoxicating. The pulp of the fruit seems

perfectly innocent, as it is eat greedily by many sorts of birds."—See *Roxburgh's Botany of the Coast of Coromandel*.

In the Hortus Malabaricus, the strychnos nux vomica is figured under the name of *Caniram*.

The seed of the fruit or berry, is the officinal nux vomica; it is flat, nearly round, about an inch broad, and about an eighth of an inch thick. Its surface is not much wrinkled or corrugated, but sometimes marked with tolerably regular fibres, running to the circumference from a sort of umbilicus placed near the centre, on each side. Its surface is rather convex on one side and concave on the other, and is covered with a kind of woolly or silky matter; internally it is hard and tough like horn, so as to be very difficultly cut or broken, and leaves a smooth and glossy surface behind the knife; to the taste it is extremely bitter, but has no remarkable smell. It consists chiefly of a gummy matter, which is moderately bitter; the resinous part is very inconsiderable in quantity, but intensely bitter; hence, rectified spirit has been considered as its best menstruum. From the recent discoveries by MM. Pelletier, Caventou, and Majendie, it appears that the nux vomica, St. Ignatius' bean, and the Upas tieute, owe their activity to a peculiar vegetable alkali, capable of exerting the most deadly effects on man and animals; to this principle they have given the name of *Strychnine*. M. Pelletier has since found *Brucine* also joined with *Strychnine* in the nux vomica.

The narcotic effects of nux vomica have been long known: John Bauhin, about the close of the sixteenth century, made experiments with it on dogs, to ascertain its nature and effects as a poison, and found that they died in frightful convulsions; and Gartner noticed that dogs so treated perished in a tetanic state: such experiments having been repeated by MM. Delille, Majendie,

Asselin, and others, it was found that animals suffering under the effects of *nux vomica* fell into real tetanus, and hence arose the idea of applying its powerful action on the muscular system, to the benefit of cases in which that system is in a state of extreme debility, from atony of the spinal marrow or other causes.

MEDICAL PROPERTIES AND USES.—M. Fouquier, physician to the Hospital of La Charité, was the first who applied these ideas to the practice of medicine, and administered *nux vomica* as a remedy for partial paralysis. He thought that as this substance produced tetanic spasms in healthy muscles, it might by a similar action on those that were deprived of power, restore it to them either perfectly or in part; and his practice was attended with a success sufficiently encouraging to warrant further trials. From the Memoir which he presented to the Society of the Faculty of Medicine at Paris, and from the trials more recently made by Dumeril, Majendie, Hebreard, Husson and Asselin, the following appear the most interesting facts in a practical point of view, connected with this medicine and its effects as a curative agent.

The voluntary muscles, and especially those which were paralyzed, are thrown into a state of complete tetanic spasm, with a violence proportioned to the dose; a creeping feeling also occurs, which announces the action of the remedy; a local perspiration also breaks out in the same parts, which is not observed in other parts of the body. All the muscles of the limbs and trunk appear liable to this impression, but the diaphragm suffers from it much less sensibly and more slowly, so that the breathing is but little affected.

But the most curious, and at the same time advantageous circumstance connected with the use of this medicine, is that by properly regulating the dose, it will produce its full effect of inducing spasmodic contraction

in the paralyzed muscles, without at all affecting the healthy parts; and it is said to influence the affected parts with an energy proportioned to the degree in which they are deprived of motion and sensation. In cases of hemiplegia submitted to the action of the *nux vomica*, the halves of the body exhibit a striking contrast; for whilst the healthy side is at rest the other is violently agitated: tetanic shocks soon succeed, and an abundant perspiration breaks out. In one female, the affected side was covered by a peculiar eruption, whilst the opposite afforded no trace of it; even the two sides of the tongue differ; a decidedly bitter taste being perceived on the one side whilst the other offers nothing similar. If a larger dose be given, the two sides of the body participate, but *unequally*, in the tetanic action. See *Majendie's Formulary*, fifth edition, p. 6.

Dr. Robert Reid of this city, has favoured me with an account of four cases of paralysis, in which he administered this medicine, of which he says, "one case was paralysis of the left side of the face; after taking the medicine a few days, the paralysis was considerably relieved, and I was induced to increase the dose of the medicine in hope of urging the cure more rapidly. In this I was disappointed, the medicine caused severe vertigo, and almost incapability of motion; these symptoms subsided in a few days, but it was remarkable, that the original disease was relieved no farther after vertigo commenced. The other three were cases of paralysis of the limbs, which were completely cured by the infusion of *nux vomica*. The patients suffered severe tetanic spasms while using the medicine. It was curious this affection took place only in the diseased limbs, and did not affect the sound members."

Independently of these phenomena, which may be called specific, there are some which are to be referred directly to its action on the alimentary canal, and others

which result secondarily from the impression made by it on the nervous system. The appetite is increased during its administration, the alvine evacuations are less frequent, and in some persons it occasions a kind of intoxication even when taken in small doses.

Dr. Fleming informs us, that the Hindoos of Upper India are in the habit of adding *nux vomica* in the process of distilling arrack, for the purpose of rendering the spirit more intoxicating.

If incautiously administered, it produces a train of the most alarming symptoms, a universal tetanus comes on, a difficulty in speaking, swallowing, breathing or passing urine, throws the patient into a state of the most painful anxiety; he becomes miserably agitated and terrified, his heart palpitates, and his body is covered with sweat. Yet all this may end without danger, the patient soon becomes calm, the spasm relaxes and goes off by degrees, and there remains afterwards only a grievous feeling of fatigue.

Paralysis sometimes yields very slowly to this remedy, sometimes is altogether unaffected by it. This will, of course, be the case if it be administered in cases of paralysis arising from organic lesion within the skull, or other causes producing compression on the origin of the nerves; such are those cases arising from bony tumours, hydrocephalus, or apoplexy; in such instances there is no hope from this remedy. Fallopius relates that *nux vomica* was given with success in the plague, that in doses of from a scruple to half a drachm it procured a plentiful sweat; in which case the patient recovered.

FORMS OF ADMINISTRATION.—The powdered seeds, an infusion, a tincture and an alcoholic extract, the last two only are ordered in this Pharmacopœia.

M. Asselin of the Hotel Dieu, administered this medicine as an enema; he employed from half a drachm

to a drachm in decoction for this purpose, and it is said with beneficial effects.

The tincture is probably the best form, as being more uniform in point of strength: in this form it may also be used by friction on the parts affected: it is a mode much employed in Italy, and from which M. Majendie has seen great benefit result in his own practice.

The doses usually given are,

Of the Powder, gr. ii to v.

Of the Infusion, ℥ i to iii.

Of the Alcoholic Extract, gr. ss to iii.

These doses may in general be repeated twice, thrice, or four times a day; but in order to avoid danger, it will be safer to begin with a moderate dose taken twice a day, and be guided by the effect it produces. A dose which does not produce any of the phenomena already mentioned is too small, but too great if it cause *general* tetanus accompanied by violent spasms. The dose of this substance in powder has been in some instances increased to thirty, forty, or fifty grains in the day before the desired effect was produced; the extract is preferable to the powder, as it is equally efficacious and may be given in much smaller bulk; during the treatment it is advisable to stop the remedy for a day or two, in order to see what effect may have been produced by it; but if its use has been entirely interrupted for some days it will be necessary to recommence its administration with the smaller doses.

In some patients the good effects of this remedy have been felt almost from the commencement, while in others they have not appeared for weeks or even months. Numerous cases of paralysis have been lately recorded, in some of which this remedy has produced great benefit, in others accomplished a perfect cure. M. Majendie says, that he has also seen very excellent effects

from it in marked cases of weakness of the genital organs, and incontinence of urine from paralysis of the bladder. It has been even asserted, that in certain circumstances this remedy has been useful in some cases of hemiplegia, the consequence of apoplexy, but this it is to be feared requires confirmation. It has been extolled as a specific in pyrosis, but in the only case in which I saw it administered it produced no good effect.

Dr. Paris informs us, that it was an ingredient in the famous *Electuarium de ovo*.

DOSE.—Five drops to twenty.

TINCTURE OF OPIUM.

Take of Turkey Opium, coarsely powdered, ten drachms.

Proof Spirit, a pint.

Macerate for fourteen days, and filter.

REMARKS.—Opium is the concrete *succus proprius* of the papaver somniferum, obtained from incisions made in the capsules. Two kinds are generally brought into market, one from *Turkey*, the other from the *East Indies*; of these the Turkey opium is much to be preferred, as being freer from adulteration, and containing much more of the active principle. *Turkey Opium* is solid, compact, perfectly opaque, of a reddish brown colour, *spec. grav.* 1,336, possesses considerable tenacity, breaks with an earthy fracture, and both sides nearly uniform in appearance: if cut, the surface is dense, and a little shining. It softens by the heat of the fingers, its taste is nauseously bitter and acrid, with some degree of warmth; it has a peculiar narcotic and disagreeable smell. It marks on paper a brown interrupted streak.

The best opium is in flattish cakes, covered with large leaves, interspersed with the capsules of a species of *rumex* used in packing it. The round masses having none of these capsules are of inferior quality. Opium is bad if it be soft or friable, mixed with any impurities, have an intensely dark or blackish colour, a weak or empyreumatic smell, a sweetish taste, or draw upon paper a brown continuous streak.

East Indian opium, when compared with that from Turkey, has *less consistence*, is lighter, of a much *darker colour*, has a more nauseously bitter *taste*, its narcotic *odour* is *fainter*, but combined with a strong empyreuma: the tincture prepared from this kind of opium, though of a much darker colour, is weaker than that prepared with the Turkey opium. Opium is partially soluble in alcohol, water, ether, wine, vinegar and lemon juice; by trituration with hot water five parts out of twelve are taken up, six are suspended, and one part remains undissolved and resembles *gluten*. The alcoholic solution contains more of the narcotic principle than the aqueous; but proof spirit is its best menstruum. According to Mr. Phillips, water dissolves less than three-sevenths of the opium, whereas proof spirit, specific gravity 930, dissolves more than two-thirds of it; a still greater proportion would of course be taken up by the spirit ordered in the present Pharmacopœia, whose specific gravity is 919.

Opium has been grown in England of a quality very little if at all inferior to the oriental.—See *Edin. Phil. Jour.* No. 11. p. 262, and *Quar. Jour. of Science*, vol. ix. p. 69; but unfortunately our climate will ever be an effectual bar to its general or extensive cultivation.

Composition. According to the researches and analyses of MM. Derosnes, Sertuerner, Robiquet, and Majendie, opium is composed of, 1st, of a fixed oil; 2d, of matter analogous to caoutchouc; 3d, of a vegeto-animal

substance ; 4th, of mucilage ; 5th, feculent matter ; 6th, of resin ; 7th, of the remains of vegetable fibres and other foreign matters ; 8th, of narcotine ; 9th, of meconic acid ; 10th, of the acid discovered by M. Robiquet ; and 11th of morphine.

Morphia appears to have been known to the older physicians under the name of “*Magisterium Opii*.” It is mentioned by Daniel Ludwig, in his *Dissertationes de Pharmacia*, second edition, 1688 ; and he does not claim the merit of having discovered it. He dissolved the opium in an acid, and then precipitated the morphia from it by saturating it with an alkali ; he does not appear however to have been acquainted with its alkaline nature.

From recent investigations it is concluded, that the active sedative principle in opium is the *morphia*, which is an alkaline salt existing in the opium, combined with the meconic or codeic acid in excess, while the power which opium possesses of causing excitement is attributed to the *narcotine*, and there are abundance of proofs that these conclusions are well founded. Turkey opium, according to the experiments of Dr. Thomson, contains three times as much morphia as the *East Indian* ; Mr. Brande informs us, that from a very carefully prepared sample of *English opium*, he procured rather a larger quantity of morphine, than from the same weight of Turkey opium ; according to him, the average produce of morphine from a pound of good opium is about five hundred grains, or one-fourteenth of its weight. The avoirdupois pound must be here intended. For a very interesting account of opium, see *Duncan's Supplement*, p. 76, et seq.

MEDICAL PROPERTIES AND USES.—Similar to those of crude opium. In small doses stimulant, in large ones powerfully narcotic and sedative, and anodyne both internally and externally. This tincture is a most con-

venient and eligible form for the administration of opium, as it affords a means of apportioning the dose with great facility and certainty. It was long known and prescribed under the name of *Thebaic Tincture*, because the ancients considered the opium brought from Thebes in Egypt as superior to any other. It was so named in the last edition of this Pharmacopœia.

Under certain forms of combination, opium becomes a most valuable auxiliary to many important medicines, by acting as a *corrigent* of some of their qualities or effects: and so rendering their action more complete. Thus, it will prevent mercurial alterative remedies from running off by the bowels, before they can produce their effect: in combination with certain sudorifics, as antimonials and ipecacuan, it increases the sudorific effects, and will at the same time act as an anodyne. Combined with diuretics, as digitalis and squill, it corrects their tendency to cause vomiting and purging, which would in a great degree defeat their diuretic operation; but it would far exceed the limits proposed in this work, to enter at length into a detailed account of the numerous effects ascribed to opium, or of the diseases in which it is administered or recommended; for as Dr. Paris observes, “In combination, the medical powers of opium are wonderfully extended, so that there is scarcely a disease in which it may not, during some of its stages, be rendered useful.”

I shall therefore confine myself to a few observations on its most important effects and forms of administration; and with respect to the latter subject, it appears as before stated, that the sedative power of opium depends on a peculiar substance contained in it called *morphia*, while the excitement and other disagreeable effects are caused by the principle which has been named *narcotine*; hence it follows, that these preparations which contain the greatest quantity of the former with the

smallest proportion of the latter, are to be preferred where the sedative effect is the object aimed at.

Thus, the acetum opii and vinum opii, which contain an acetic solution of morphia, its most active form, and the extractum opii aquosum, which contains only a very small proportion of narcotine and very little resin, produce their beneficial effects with comparatively little of the general disturbance of the system, which so generally follows the use of crude opium or common laudanum. The medicine known by the name of *Black Drop*, is also for the same reason an eligible form for administering opium. See Acetum Opii. Rousseau's Drops are somewhat similar to the Black Drop.

With respect to its effects, and the proper circumstances under which it ought to be administered, it has been long regarded as a general rule, that "its use is contra-indicated in all cases where inflammatory action prevails," and this to a certain extent is true; but the exceptions are very numerous, as it is found to produce the most beneficial effects in several highly acute and inflammatory disorders. Practitioners in the hotter regions of the earth, and especially in India, have long been in the habit of giving opium freely in acute diseases, and even in tropical inflammation, after, or in company with venesection, and generally in combination with calomel. "The utility of this practice," adds Dr. Johnson, "has been long established in those climates, and it is now making its way in this country, with some little variety in the modus."—See *Med. Chir. Review*, June, 1824.

Dr. Armstrong, of London, enjoins this practice very strongly; and in a paper which he published on the subject, he recommends the exhibition of opium in some most acute inflammatory affections, as acute inflammation of the peritoneal covering of the stomach, intestines, and uterus; in such cases, after a copious venesection.

tion, he administers three, four, or even five grains of good opium in the form of a *soft* pill. “The effects,” he says, “of opium thus administered, are to prevent a subsequent increase in the force or frequency of the heart’s action, and a return of the abdominal pain, while it induces a tendency to quiet sleep and a copious perspiration over the whole surface.” To the correctness of this statement, I can bear testimony from the decidedly beneficial result of such a mode of treatment, in some cases of puerperal peritonitis, which came under my observation; and no remedy so effectually relieves the excruciating pain of acute rheumatism, which generally makes its attack at night, as a pill containing gr.iss of opium combined with gr.iss of calomel, and gr. $\frac{1}{4}$ of tartarized antimony. In swelled testicle, accompanied by a high degree of inflammation, the administration of a full dose of opium, after the application of leeches, is productive of the best effects.

In intermittent fever, opium, combined with brandy, and given during the cold stage, will often put an end to it; or if given before its accession, will prevent it. The value of opium in the treatment of tetanus is almost universally acknowledged, and in diabetes it is very generally regarded at present, as the most effectual remedy for alleviating the symptoms of that distressing and almost incurable disease. In the case related by Mr. Mooney, in the 5th vol. of the *Med. Chir. Trans.* it reduced the quantity of urine passed in the day from twenty-five pints to seven; but in both this disorder and tetanus, in order to produce the good effects of opium, it must be given in quantities much exceeding the ordinary, even to the extent of twenty to thirty grains in the course of the twenty-four hours. Dr. Currie gave five ounces of the tincture in the course of the day in a case of tetanus.

After surgical operations a full opiate is generally

given, and with good effect; it soothes the pain, calms the patient's feelings, induces sleep, and so tends to prevent the fever which so often comes on under such circumstances.

In dysentery and diarrhœa, after the exhibition of purgatives, opiates give great relief; in the former disease by relieving the tormina and tenesmus, and in both restraining the excessive discharge.

The vomitings which sometimes so distress nervous persons or pregnant women, are often quieted by opiates better than by any other remedy: and cases have occurred where it produced this effect, applied by rags wet with laudanum over the region of the stomach.

In cholera and in pyrosis opium is a valuable remedy. It is also frequently introduced into the rectum, either in form of a suppository or as an enema.

As an external application in the form of liniment or otherwise, opium possesses considerable anodyne effects, particularly if combined with acetic acid. The following liniment is recommended as useful in convulsive or spasmodic affections:

R Tincturæ Opii ℥ ss.

Olei Olivarum ℥ i.

Vitelli Ovi. q. s. ut fiat linimentum.

The quarter of this to be rubbed on the thighs or legs twice or thrice a day.

Opium is often applied with good effect to the surface of sores, from which it is readily absorbed into the system; Sir Astley Cooper mentions "a case, in which a tetanic affection was produced in a child, whose leg had been amputated, and where the application of opium to the stump gave more immediate relief than I ever remember to have witnessed. It relieved the spasms, and, as I believe, saved the child;" and he adds, "If opium, applied to the surface of sores, be absorbed into

the system it produces excessive costiveness, extreme pain in the head and torpor of the system, which is only to be removed by the frequent administration of active purgatives."

The torpor of the intestines caused by opiates, in consequence of their paralyzing for a time their muscular fibres, may be best counteracted by aloetic purgatives, which have a directly contrary effect, that of increasing the peristaltic motions.

The administration of opium is frequently followed by clay coloured stools, shewing that the biliary secretion into the intestines has been interrupted; this may be best obviated by combining mercurials, particularly calomel, with the opium, or giving them shortly afterwards, either alone or in combination with aloetics.

It is often productive of considerable benefit in threatened abortion, and in tedious labour where delivery is impeded by rigidity of the os uteri or other soft parts. Opium should never be given to infants if possible to avoid it, as it is apt to produce very untoward effects in them. Nor should it be given to mothers who are giving suck, at least without cautioning them not to suckle their child for some hours after. A case came to my knowledge a short time since, in which a woman, who was nursing her child, took twenty drops of laudanum to procure sleep, which had been disturbed for some nights by the pain of a sore breast; the infant sucked a great deal during the night, and was so affected in consequence, that it remained for nearly twenty-four hours in a state of complete torpor almost resembling death, from which no effort could rouse it, though every means were used for the purpose. It however ultimately recovered.

Some of the oriental nations use opium habitually as a cordial stimulant, and as such, take it frequently in the day, to an amount which would appear almost in-

credible. Dr. Smith mentions, in the Philosophical Transactions, that being at Smyrna, he saw a man who took every day *three drachms* of opium, half in the morning and half after dinner, to prevent him from falling asleep; this habit he continued for twenty-four years, and had begun with a grain; but Dr. Smith says, that the consequence was premature old age. The Turks eat opium when going into battle, to excite them and rouse their courage; but this habitual use of opium completely blunts both the mental and corporeal faculties. I knew a person who every day took from thirty to sixty drops of laudanum to cheer him and prevent low spirits, which it did effectually; but whenever accident prevented the habit from being indulged in, the consequence was a state of the most pitiable depression and misery of mind and body. Russel observes, that the effects of opium on those addicted to its use, are at first obstinate costiveness, succeeded by diarrhœa and flatulence, with loss of appetite and a sottish appearance; the teeth decay, the memory fails, and the unhappy sufferer prematurely sinks into the grave.

Of crude opium, from half a grain, to a grain and a half, and from ten drops to sixty or more of the common tincture, are the quantities which may be considered as constituting a general dose for an adult; for children, particularly infants, the dose should be very small, not exceeding a drop or two; but under particular circumstances these doses may be greatly exceeded, as in some spasmodic affections, particularly tetanus, and in diabetes: in cases attended by great bodily suffering, very large doses may be taken without any very sensible effect being experienced, but it sometimes happens that one-fourth of a grain will produce an effect in one person which ten times the quantity will not produce in another. I know a lady whom so small a dose as five drops of laudanum would throw into a state of delirium.

In case of an overdose being taken, a full emetic of the sulphate of zinc or copper, dissolved in a very small quantity of water, should be immediately given, and the stomach well evacuated by vomiting; after this is accomplished, vinegar diluted, and other acidulous drinks, should be given; drowsiness should be prevented by keeping the patient in motion, giving ammonia, brandy, or strong coffee; or, by immersion in a tepid bath. Bleeding is sometimes necessary to relieve the vessels of the brain, and may be best performed in the jugular vein. When the overdose taken is a fluid preparation, the stomach pump affords an expeditious and certain means of withdrawing from the stomach its poisonous contents:

DOSE.—Ten drops to sixty or more.

CAMPHORATED TINCTURE OF OPIUM OR PAREGORIC
ELIXIR.*

Take of Turkey Opium, in powder,
Benzoic Acid, of each a drachm,
Camphor, two scruples,
Essential Oil of Aniseed, a drachm,
Proof Spirit, two pints.

Macerate for fourteen days, and filter.

REMARKS.—The essential oil of aniseed is not an ingredient in the present formula of either the London or Edinburgh Colleges; but it is a useful addition, tending to relieve the griping pains in the bowels of young children, to whom this tincture is very frequently given. In the London Pharmacopœia this preparation is called *Tinctura Camphoræ Composita*, a change more likely to

* Literally the *Elixir of Consolation*.

give rise to error than the old name : four drachms and a half of this tincture contain about a grain of opium. For a full and interesting account of the different kinds of laudanum, see *Duncan's Supplement*, p. 172.

MEDICAL PROPERTIES AND USES.—It is anodyne. It was formerly prescribed under the name of the *Elixir Asthmaticum*, a name not ill applied, as it is very effectual in allaying the irritation which attends the cough, so common and so distressing to persons affected with asthma. It is much used in whooping cough. Mr. Brande observes, “ Paregoric elixir is often found in the nursery, especially for the cure of whooping cough, where its indiscriminate use cannot be too severely reprobated;” the same censure would, with equal justice, apply to Dalby's carminative, and all other medicines containing opium, the administration of which to young children always requires the nicest caution even in a medical attendant, and certainly should never be left to the discretion of persons not only ignorant of its proper management, but in all probability unconscious that opium is contained in the medicine which they are giving.

The sedative powers of this preparation are much inferior to those of the simple tincture, of which an equal quantity contains more than twenty times as much opium.

DOSE.—From one to two or three drachms.

TINCTURE OF CUBEBS PEPPER.

Take of Cubebs Pepper, four ounces,
Proof Spirit, two pints.

Macerate for fourteen days, and filter.

REMARKS.—The cubebs or Java pepper is now introduced into this Pharmacopœia for the first time, and does not appear in that of the London or Edinburgh College at present, though it was formerly included in the *Materia Medica* of both, and was one of the ingredients in the composition of *Mithridatium* and *Theriaca Andromachi*. The piper cubeba is a native of Java and other parts of the East Indies, of the class *Diandria*, order *Trigynia*, and included by Jussieu amongst the genera akin to the natural order *urticæ*. The berries grow in clusters like currants, and on partial footstalks which remain attached to them, from whence they have received the name of *Piper Caudatum*; when dried they have a wrinkled surface, brown colour, a warm, pungent, aromatic, and slightly bitter taste; but much milder than common pepper.

Hill, in his *History of the Materia Medica*, page 473, says, “there are two kinds of cubebs brought to these countries differing in their appearance, but both produced from the same plant. The one kind gathered before they were ripe are small, very much wrinkled on the surface, and when broken, their nucleus is found to be small and flaccid. The ripe ones are of a less wrinkled surface, sometimes indeed quite smooth, and when broken, their seed is found to be large, plump, and full. These last are therefore heavier than the others.”

On examination I found this statement to be correct; we should therefore choose the latter sort as probably containing more of the medicinal powers, and in a state of greater perfection.

This pepper, according to the analysis of M. Vauquelin, is composed of a volatile oil which is nearly solid, *a resin resembling copaiba balsam*, another coloured resin, a colouring gummy matter, an extractive principle similar to that of legumes, and some saline substances. He considers *the resin resembling the copaiba*

to be the peculiar matter in which the property resides, which imparts to cubebs the power of curing gonorrhœa. Others suppose this power to reside in the volatile oil; but it is found that an extract made with rectified spirit possesses the whole of its virtues, which therefore cannot reside in the volatile but in the more fixed parts. It is very generally administered in powder, in doses of from one to two drachms, three or four times a day: but as such doses of the powder are very bulky, and therefore hard to take, and as proof spirit dissolves the efficacious parts of the cubebs, the tincture, as here directed, affords a more convenient and equally efficacious form of administration. Garcias says, “*apud indos cubebæ in vino maceratarum est usus ad excitandam venerem.*”

ADULTERATIONS.—Dr. Paris says, that “the Turkey yellow berries, *i. e.* the dried fruit of the *rhamnus catharticus*, are often substituted for the cubebs, and the similarity between them is so great that the casual observer may be easily deceived.” Pimenta berries are also often mixed with the cubebs, and may be distinguished from them by wanting the foot stalk, and by being in general larger than the cubebs; their taste also is very different; but the most certain distinction is, that the pimenta berry is *bilocular*, and contains *two seeds*, while the cubebs contain but one; this will also distinguish it from the berry of the *rhamnus c.* which contains *four*. But if they have been reduced to powder it would be almost impossible to detect the imposition.

MEDICAL PROPERTIES AND USES.—It is a warm aromatic stimulant, opens the bowels, and increases the discharge of urine, to which it imparts its peculiar smell. It generally improves the appetite and exhilarates the spirits, but in other instances it occasions headach, nausea, and mental anxiety. Dr. Duncan says, that “in a few cases it caused swelled testicle, and in one it produced urticaria.” Within the last few years, it has

been introduced very generally into practice for the cure of gonorrhœa, and its success in this disease has received the testimony of many eminent practitioners. In a work on the subject by Jeffreys, he states, that of twenty-one cases of gonorrhœa taken by him indiscriminately, and treated with cubebs, fourteen were cured, four relieved, and three were not benefited; and he mentions that in those cases where it failed, the symptoms yielded much more readily to copaiba than under ordinary circumstances; he adds also, that gleet seldom follows the cure by cubebs. In the 12th vol. of the Med. Chir. Trans. Mr. Broughton has published the result of trials made with cubebs in his own practice, for the cure of gonorrhœa. Of fifty cases in which he used it, forty-one were cured, five relieved, one cured and relapsed, three failed. The forty-one successful cases were cured in less than a month, with one exception; the greater number in less than three weeks, and several in a few days, among which latter some were well in forty-eight or thirty-six hours: the relief in all cases where the symptoms were urgent was very sudden; only two instances of swelling of the testicles occurred, and one of chordee, continuing after the exhibition of the cubebs, although in other respects the complaint was relieved directly." "Cubebs," says Sir Astley Cooper, "appears to produce a specific inflammation of its own on the urethra, which has the effect of superseding the gonorrhœal inflammation. They who have tried cubebs and do not acknowledge its value as a remedy for gonorrhœa, cannot have made any accurate observations on the subject. It is a remedy of the most admirable and useful kind, and may be given with advantage even in the inflammatory stages of gonorrhœa, provided the inflammation does not run excessively high. It is a most useful remedy also for the cure of gleet, as it is called, where gonorrhœa has continued for a great length of

time. In the very early stages of gonorrhœa, when the inflammation is just beginning, it often succeeds in removing the disease in a very short space of time :” he adds, “ the greatest advantage may be derived from combining its use with that of the balsam of copaiba.” Dr. Crane, of Boston, Lincolnshire, has also published an account of the success of cubebs in gonorrhœa, and he has found it useful in some cases of rheumatism and also in leucorrhœa, particularly if administered in combination with magnesia ; this gentleman adds, “ when the gonorrhœa is removed, the cubebs should be still continued for ten days or a fortnight, the patient gradually diminishing in the course of each day the frequency of his taking the doses. If this be not attended to, the complaint is apt to return.”

Dr. Jameson has published four cases of its complete success in leucorrhœa.—*Edin. Med. Jour.* vol. xviii.

It has been objected to this tincture, that “ the spirit is likely to undo the good effects of cubebs on the mucous membrane of the urethra ;” this may be very plausible in theory, but I know it is not true in fact, I have found this tincture cure gonorrhœa both speedily and satisfactorily.

DOSE.—Of the Powder, one drachm to two.

Tincture, one or two drachms three times a day.

TINCTURE OF QUASSIA.

Take of Raspings of Quassia Wood, an ounce,
Proof Spirit, two pints.

Macerate for seven days, and filter.

REMARKS.—The bitter principle of the quassia wood, which has been named *Quassine*, is completely taken up by proof spirit; hence this tincture possesses all the intense bitterness of the wood itself. This tincture, and the tincture of galls, were first introduced into the Dublin Pharmacopœia, and afterwards into that of Edinburgh; they are not in the London. The infusion is the best form for administering quassia.

MEDICAL PROPERTIES AND USES.—See *Infusum Quassiæ*.

DOSE.—Half a drachm to two drachms.

COMPOUND TINCTURE OF RHUBARB.

Take of Rhubarb Root, sliced, two ounces,
Cardamom Seeds, husked and bruised,
Liquorice root, bruised, of each half an ounce,
Saffron, two drachms.
Proof Spirit, two pints.

Macerate for seven days, and filter.

REMARKS.—There are two kinds of rhubarb brought into these countries, Russian, improperly called by us Turkey rhubarb, and East Indian or Chinese rhubarb; the former, which is the best, is generally in round pieces, of a reddish or whitish yellow colour, feels gritty between the teeth, and is often perforated with so large a hole that many pieces have the appearance of a mere rind.

It got the name of Turkey rhubarb, because at the time when the commerce of the East was carried on through Natolia, it came to Europe entirely from the ports of Turkey.

The activity of rhubarb is said to depend chiefly on an extractive matter which has been called *Rhabarbarine*. M. Nani, an Italian apothecary, announced that the active principle of rhubarb may be combined with sulphuric acid, by a process similar to that for obtaining sulphate of quinine; and this sulphate of rhabarbarine, as it has been termed, possesses all the activity of the rhubarb in a very concentrated and convenient form. According to M. Caventou, this sulphate contains heterogeneous matters, and among others sulphate of lime.

MEDICAL PROPERTIES AND USES.—It is stomachic and purgative; it is seldom given alone, but as an adjunct to saline purgatives.

DOSE.—One, two, or three drachms.

TINCTURE OF SQUILL.

Take of the Bulb of the Squill, dried, four ounces,
Proof Spirit, two pints.

Macerate for seven days, then set it aside, and when the fæces have subsided, pour off the clear liquor.

REMARKS.—The active principle of the squill, called by Vogel *Scillitin*, is soluble in alcohol, and consequently this tincture possesses the powers of the squill itself.

MEDICAL PROPERTIES AND USES.—Squill is expectorant, emetic, and diuretic. This last effect is rendered more certain and considerably augmented by combining it with mercurials, and with this intention it is much used in dropsical affections.

DOSE.—Ten drops to twenty, three times a day; about thirty drops are equivalent to a grain of squill.

COMPOUND TINCTURE OF SENNA.

Take of Senna Leaves, a pound,
Caraway Seeds, bruised, an ounce and a half,
Cardamom Seeds, husked and bruised, half
an ounce,
Proof Spirit, *by measure*, a gallon.

Macerate for fourteen days, and filter.

REMARKS.—In the Edinburgh Pharmacopœia, jalap is added to this tincture; in the former edition of this Pharmacopœia it was called *tinctura sennæ*. In the London Pharmacopœia of 1720, it was called *Elixir Salutis*.

Senna has been analyzed by MM. Lassaigne and Feneulle, who have called its purgative principle *Cathartine*.

MEDICAL PROPERTIES AND USES.—It is stomachic, carminative, and purgative, the active principle of senna, cathartine, being soluble in the spirit: it is generally given as an adjunct to other purgatives, particularly infusion of senna: senna is very apt to cause griping, to prevent which the aromatics are added in the tincture.

Dr. Paris says that “*Daffy’s Elixir* differs from this tincture only in the addition of treacle, aniseeds, and elecampane root; but Mr. Brande says, “we have reason to suspect opium in some of the nostrums sold under that name.” *Gout cordial* is a mixture of the compound tinctures of rhubarb and senna. This tincture is a very good addition to carminative mixtures. See *Infusum Sennæ*.

DOSE.—From two drachms to one ounce.

TINCTURE OF SNAKE ROOT.

Take of Virginian Snake Root, sliced and bruised,
three ounces,
Proof Spirit, two pints.

Macerate for seven days, and filter.

REMARKS.—Chevallier thinks that the active principle of serpentaria, has much analogy with the bitter principle of the *quassia amara*, and also with those obtained from the *bryonia alba* and from colocynth:

MEDICAL PROPERTIES AND USES.—Tonic, stimulant, and diaphoretic. It is principally employed as a stimulating adjunct to the infusion or decoction of cinchona in typhoid fevers.

DOSE.—From half a drachm to two drachms.

TINCTURE OF VALERIAN.

Take of Valerian Root, in powder, four ounces,
Proof Spirit, two pints.

Macerate for seven days, and filter.

MEDICAL PROPERTIES AND USES.—It is stimulant and antispasmodic, and is given in nervous affections. In cases of epilepsy, where the patient has some warning symptom of the approach of the fit, I have found the following draught taken just before the attack was expected, prevent its accession:

Etheris Sulphurici ʒ ss.

Tincturæ Valerianæ ʒ i.

Aquæ Ammoniæ Causticæ guttas xx.

Aquæ ʒ i.—Misce.

In Siberia children affected with epilepsy, are made to eat the root of the great valerian quite raw.

Dose.—Half a drachm to two drachms.

AMMONIATED TINCTURE OF VALERIAN.

Take of Valerian Root, powdered, two ounces,
Spirit of Ammonia, a pint.

Macerate for seven days, and filter.

MEDICAL PROPERTIES AND USES.—Similar to those of the last preparation, but more active, as the ammonia not only coincides in its action with the valerian, but also dissolves more of its active principle than proof spirit, and thereby considerably promotes its efficacy.

Dose.—From one drachm to two, in milk or any bland fluid.

TINCTURE OF GINGER.

Take of Ginger Root, coarsely powdered, two ounces
and a half,
Rectified Spirit, two pints.

Macerate for seven days, and filter.

REMARKS.—In the former edition of this Pharmacopœia, this tincture was directed to be made with proof spirit and with only two ounces of ginger, the quantity of ginger might be still further increased with advantage. The substitution of the rectified spirit is a great improvement, as it takes up the acrid principles of the ginger without acting on the mucilage, which when proof spirit was used, rendered the tincture turbid. Ac-

according to Dr. Paris; *Oxley's concentrated Essence of Jamaica Ginger*, is merely a solution of ginger in rectified spirit.

MEDICAL PROPERTIES AND USES.—It is stimulant and stomachic, and as such is used in gout of the stomach, in flatulent colic, and as a corrigent of cold or griping medicines.

DOSE.—Half a drachm to two drachms.

The tinctures in the preceding chapter should be prepared in close vessels, which ought to be frequently shaken during their digestion.

The hemlock, foxglove, and henbane, should be collected while in flower, in those places where they grow spontaneously.

A Table shewing which of the Tinctures ordered in the present Pharmacopœia are made with Rectified Spirit, and which with Proof Spirit.

RECTIFIED SPIRIT IS USED IN PREPARING	PROOF SPIRIT IS USED IN PREPARING
Tinctura Assæfoetidæ,	Tinctura Aloës.
———— Balsami Tolutani.	———— Angusturæ.
———— Benzoes Composita.	———— Buchu.
———— Camphoræ,	———— Cantharidis.
———— Ferri Acetatis,	———— Capsici.
———— Ferri Acetatis cum	———— Cardomomi Com-
Alcohol.	posita.
———— Guaiaci.	———— Cascarillæ.
———— Iodine.	———— Castorei Rossici.
———— Moschi.	———— Catechu.
———— Myrrhæ.	———— Cinchonæ.
———— Nucis Vomicaæ.	———— Compo-
———— Zinci Acetatis.	sita.
———— Zingiberis.	———— Cinnamomi.
	———— Semen Colchici.
	———— Colombæ.
	———— Conii.
	———— Digitalis.
	———— Galbani.
	———— Gallarum.
	———— Gentianæ Compo-
	posita.
	———— Hellebori Nigri.
	———— Humuli.
	———— Hyoscyami.
	———— Jalapæ,
	———— Kino.
	———— Opii.
	———— Camphorata.
	———— Piperis Cubebæ.
	———— Quassiaæ.
	———— Rhei Composita.
	———— Scillæ.
	———— Sennæ Composita.
	———— Serpentariaæ.
	———— Valerianaæ.

MEDICATED VINEGARS.

REMARKS.—Vinegar is a very efficient solvent of the proximate principles of vegetables, and in particular of some of the alkaloids upon which their activity as remedies, depends, as in opium, meadow saffron, and squill.

Medicated Vinegars are, however, very apt to spoil, and should therefore be made only in small quantities at a time, and preserved in well stopped glass bottles.

In the former edition of this Pharmacopœia, there were but two of these vinegars ordered, the camphorated acetic acid and the vinegar of squill; to these have been now added two others of great value, those of meadow saffron and opium, the latter of which is peculiar to this Pharmacopœia.

CAMPHORATED ACETIC ACID.

Take of Acetic Acid, *by measure*, six ounces,
Camphor, half an ounce,
Rectified Spirit, a sufficient quantity.

Reduce the camphor to powder by means of the spirit, then add the acid, and dissolve.

REMARKS.—The spirit is used merely to facilitate the reduction of the camphor to powder, as the acid is capable of itself of dissolving even a larger proportion of camphor. This is an exceedingly volatile and corrosive preparation, and should therefore be kept in glass phials, with well ground glass stoppers. It is an official substitute for *Henry's Aromatic Vinegar*, which, according to Dr. Paris, is merely an acetic solution of camphor, oil of cloves, of lavender, and of rosemary.

The Edinburgh Pharmacopœia gives a formula under the name of *acidum aceticum aromaticum*, as an improved preparation of the *vinaigre des quatre voleurs*, or *thieves vinegar*; it is composed of rosemary tops, sage leaves, lavender flowers, cloves, and weak acetic acid.

MEDICAL PROPERTIES AND USES.—It is stimulant, and is used as an analeptic remedy. The vapour snuffed up the nostrils is a powerful stimulant in syncope. It is never used internally.

VINEGAR OF MEADOW-SAFFRON.

Take of fresh bulb of Meadow Saffron, sliced, an ounce,
Distilled Vinegar, a pint,
Proof Spirit, an ounce.

Macerate the bulb of the meadow saffron with the acid for three days in a close glass vessel, then express it and set it by, that the fæces may subside; lastly add the spirit to the defæcated liquor.

REMARKS.—This preparation is now for the first time introduced into this Pharmacopœia. It was ordered in the specimen Pharmacopœiæ published by the College of Physicians in 1794, but was omitted in the Pharmacopœia of 1807.

Vinegar is one of the best solvents of the medicinal principle of the colchicum, which is soluble in all the vegetable acids. The bulbs should be taken up between the month of June and the middle of August. “The bulbs, when mature, on being cut transversely yield a milky-looking acrid juice, which produces a beautiful cærulean blue colour if rubbed with the alcoholic solution of guaiac. To preserve the virtues of the plant, the

bulb, as soon as possible after it is dug up, should be cut into transverse slices not thicker than one-eighth of an inch, and dried by placing the slices on clean white paper, distinct from each other, without heat, or at a very low temperature. The test of the drug, being good and properly dried, is the appearance of the blue colour, on rubbing it with a little distilled vinegar and the solution of guaiac. The slices also should not appear deeply notched or panduriform, as this is the mark of the bulb having begun to empty itself for the nourishment of the young bulbs, and consequently to suffer in its medicinal powers from the chemical change, which, at this period, its contents must necessarily undergo for the nourishment of the offsets. It should be kept in slices, in well stopped bottles.”—*London Dispensatory*, 5th ed. p. 284.

The rectified spirit is added to prevent decomposition from fermentation.

MEDICAL PROPERTIES AND USES.—It is an uncertain diuretic and purgative, and is used in dropsy, rheumatism, and gout; and in the latter complaint Dr. Scudamore recommends this as preferable to any other preparation of colchicum. See *Tinctura seminum colchici*.

DOSE.—Half a drachm to two drachms in any bland fluid.

VINEGAR OF OPIUM.

Take of Turkey Opium, four ounces,

Distilled Vinegar, a pint.

Rub the opium into a pulp with a little of the vinegar, then add the remainder of the vinegar; macerate the mixture in a close vessel for seven days, frequently shaking; then pour off the supernatant liquor, and filter.

REMARKS.—This preparation is now introduced for

the first time by the Dublin College, and does not appear in the Pharmacopœia of London or Edinburgh. It is a preparation of considerable activity, as *morphine*, the active principle of the opium is very soluble in acetic acid, and the acetate thus formed is an extremely active form for its administration.

M. Majendie found that a quarter of a grain of acetate of morphia produces the most beneficial effects that can be expected from an anodyne, allaying pain and procuring sleep, without, in any degree, affecting the cerebral functions: and Dr. A. T. Thompson says, he “can from his own experience verify the fact.”

If vinegar be taken into the stomach while opium is also present there, the effects of the opium and the danger thence arising are greatly increased. Chardin, in his travels through Persia, informs us, that when a Persian finds himself in a distressed situation, he has recourse to a piece of opium as large as the thumb, and that immediately afterwards he drinks a glass full of vinegar, by which he is thrown into a fit of laughter, terminating in convulsions and death.

MEDICAL PROPERTIES AND USES.—It is anodyne and sedative, and has the great advantage of possessing powerful anodyne properties, without constipating the bowels, affecting the head, or causing the general disturbance of the system which so generally attends the use of the more ordinary forms in which opium is administered. The same remark is applicable to a preparation known by the name of *Black Drop*, as well as to another more recently introduced by Dr. Porter of Bristol, which is a solution of opium in citric acid, and named by him *Liquor Morphiæ Citratis*, the formula for its preparation is,

℞ Opii crudi optimi ℥iv. acidi citrici cryst: ℥ii. semel in mortario lapideo contunde, dein aquæ distillatæ affunde libram ;

et intime misceantur ; macera per horas viginti quatuor, et per chartam bilulosam cola.

But as *narcotine* exists in all these preparations, more or less, it would be a considerable improvement if they were prepared with pure morphine, or with extract of opium deprived of narcotine, by which means they would be still less apt to disturb or excite, and be more decidedly sedative. The following formula for this is proposed by Magendie :

Take of Pure Morphine, sixteen grains.

Crystallized Citric Acid, eight grains.

Dissolve them in an ounce of distilled water, and colour the solution with two drachms of tincture of cochineal.

This solution is used by drops, and from six to twenty-four may be given in the twenty-four hours.

I think it worth mentioning, that I have found this preparation of opium decidedly superior to every other in relieving the agony of cancer uteri, and procuring rest at night. The following is the form in which I am in the habit of prescribing it in such cases :

℞ Aceti opii guttas xx—xxx.

Aquæ Cinnamomi ℥i.

Syrupi Zingiberis ℥i. Fiat haustus.

The following remark is made by Hill in his History of the Materia Medica, page 784 : “ Vinegar almost entirely dissolves opium ; but Le Mort observed a very odd effect from this tincture, which was, that it often brought on suppressions of urine.”

One instance completely corroborative of the power which this preparation exercises over the bladder, came not long since under my observation, in a lady who unfortunately addicted herself to the use of opium ; she used the acetum opii, but was soon obliged to give it up

in consequence of the violent derangement in the function of the bladder which ensued; and which has three several times recurred upon her resuming the use of this preparation, though no such effect is produced in her by the common tincture, though taken in equally large doses.

See also an instance of the same effect produced by the *black drop*, in a deeply interesting case, related by Dr. Thos. Beatty, in the 5th vol. of the Dublin Hospital Reports, p. 185, note.

DOSE.—Six drops to thirty; twenty drops of this being equivalent to thirty of the common tincture of opium.

VINEGAR OF SQUILL.

Take of the Bulb of the Squill, sliced and recently dried, half a pound,
Distilled Vinegar, three pints,
Rectified Spirit, *by measure*, four ounces.

Macerate the bulb of the squill in the vinegar for seven days, in a glass vessel, frequently shaking it; then draw off the vinegar, to which, poured from the fæces after they have subsided, add the spirit.

REMARKS.—Vinegar dissolves the active principle of the squill, and such a preparation is of great antiquity, being mentioned by Ausonius,

“*Scillato decies si cor purgeris aceto*
Anticipitesque tuum Samii Lucomonis acumen.”

After being some time made, it deposits citrate of lime and tannin, without however suffering any diminution of its efficacy. The rectified spirit is added to prevent decomposition.

MEDICAL PROPERTIES AND USES.—It is diuretic, expectorant, and emetic, and is used in dropsies, asthma, and chronic catarrh.

DOSE.—Half a drachm to two drachms in some flavoured or aromatic water.

MEDICATED WINES.

REMARKS.—Wine is capable of extracting several proximate principles of vegetable substances, acting nearly in the same manner as diluted spirit, dissolving such of their constituents as can be taken up by water and alcohol when combined.

Wine, however, as a solvent, is liable to the objections of inequality of strength and its tendency to fermentation, which latter is greatly increased by its having taken up vegetable matters: so that in fact, as Parmentier has shewn, the greater number of medicated wines, if kept for any length of time, become medicated vinegars.

To remedy these disadvantages in this class of preparations, Parmentier has proposed, that instead of preparing medicated wines in the usual way, the alcoholic tinctures well prepared should be added to wine in given quantities; by which means he contends, that the preparations are less nauseous, and, what is still a greater advantage, are always of a determinate strength.

There appears a remarkable inconsistency in the London Pharmacopœia, with regard to these medicated wines: they have rejected the use of wine altogether in pharmacy, and even omitted it in the list of *Materia Medica*, but have retained the title. They have *Vinum Aloes*, *V. Ipecacuanhæ*, *V. Veratri*, *V. Colchici*, *V. Opii*, *V. Antim. Tart.* and *V. Ferri*, which contain no wine; and the tartar emetic wine, which was called *Liquor Antim. Tart.* when it was made with wine, is now called *Vinum* when it contains none.

WINE OF ALOES.

Take of Socotorine Aloes, four ounces,
Canella Bark, an ounce,
Spanish White Wine, three pints,
Proof Spirit, a pint.

Mix together the aloes and canella previously powdered separately, and pour on them the wine mixed with the spirit: then macerate for fourteen days, frequently shaking the vessel, and lastly filter the liquor.

REMARKS.—Wine is a good solvent of aloes, and this solution contains the virtues of the remedy in a more agreeable form than the tincture. It was formerly known by the name of *Tinctura Sacra*, under which title it is to be found in the specimen *Pharmacopœiæ* of 1794.

MEDICAL PROPERTIES AND USES.—It is stomachic and purgative, according to the dose, and is useful in cold habits, in dyspepsia and chlorosis.

DOSE.—As a stomachic one drachm to two; as a purgative one ounce to two.

WINE OF IPECACUAN.

Take of the Root of Ipecacuan, bruised, two ounces,
Spanish White Wine, two pints.

Macerate for fourteen days, and filter.

REMARKS.—Wine forms a good menstruum for ipecacuan, as its active principle *Emetine* is very soluble therein. The best ipecacuan root yields sixteen per cent. of this principle; and according to Dr. A. T. Thomson, a pint of wine takes up one hundred grains of ipecacuan; if this be correct, each ounce of wine will contain as nearly as possible a grain of emetine.

MEDICAL PROPERTIES AND USES.—It is expectorant, emetic, and diaphoretic. It is milder in its operation than antimonial wine, and is therefore to be preferred as an emetic for infants or children in doses of half a drachm; for adults it may be conveniently combined with tartar emetic; but in all cases it would be prudent to give ipecacuan in doses very much divided, as it sometimes produces in certain persons very unexpectedly violent effects. A lady lately a patient of mine, experienced full vomiting in consequence of taking less than half a grain of the substance; and the same effect was produced every time she repeated the use of the pills in which it was contained. I was since informed by Dr. Barker, of a gentleman who was sure to be seized with nausea and sick stomach if he sat near an open paper of the powder. In my own person I have found so small a quantity as fifteen drops of this wine act as an emetic. Ipecacuan is given as an expectorant in cough, and other affections of the lungs or bronchia; combined with purgatives it assists their effects: in conjunction with opium it is a valuable diaphoretic, as in the well known *Dover's Powder*, and in this form it is much used in dysentery and diarrhoea. In very small doses it acts as a stomachic, and gives energy to the digestive organs.

DOSE.—As an emetic for adults two drachms to half an ounce, as a diaphoretic ten drops to forty repeated.

WINE OF OPIUM.

Take of Turkey Opium, an ounce,
Cinnamon Bark, bruised,
Cloves, bruised, of each half a drachm,
Spanish White Wine, a pint.

Macerate for eight days, and filter.

REMARKS.—This preparation is now for the first time introduced into this Pharmacopœia; it nearly coincides with the *Laudanum Liquidum Sydenham*, under which name it appears in the London Pharmacopœia 1720; this latter contained a drachm of saffron, and double the quantity of opium here ordered.

MEDICAL PROPERTIES AND USES.—Narcotic and anodyne. Its uses are similar to those of the tincture, but its taste and smell are rendered more agreeable by the aromatics. Its use also is not attended by the disturbance of the nervous system, which so often follows the administration of the tincture. Mr. Ware recommends it highly as an application to the eye in chronic ophthalmia.

DOSE.—Ten drops to one drachm.

CLARIFIED HONEY.

Melt the honey in a water bath, and remove the scum.

REMARKS.—By this process the wax and lighter impurities rise to the top, and are removed, while sand or other heavier substances subside, and so are got rid of. Clarified honey is inferior in smell and flavour to fresh honey in the comb; but it is less apt to ferment or produce griping. The qualities of honey vary very much, according to the situation in which it has been gathered, and as in its sensible qualities it partakes of those of the herb or flower from which it was taken;

“ ——— Redolentque thymo fragrantia mella.”

so also it not unfrequently produces the effects of particular plants, and is even said to be poisonous. I know a person in whom a very small quantity of honey

never fails to procure hives within a few hours after eating it.

Honey, united with vinegar, constitutes *Oxymel*; dissolved in water it ferments by degrees, and forms a liquor known by the name of *Hydromel*.

The syrup of Lowitz is made by treating honey with water, animal charcoal, and chalk, by which means a syrup is obtained, which, when the honey is of good quality, is equal to the best syrup made with sugar.

The process of Lowitz was as follows: take of honey six pounds, water a pound and a half, powdered chalk three ounces, charcoal washed, dried, calcined, pulverized and sifted, six ounces; two whites of eggs mixed with a pound of water. Dissolve the honey in the water by the aid of heat; raise it to ebullition; then add the chalk little by little, and stir it; remove it from the fire after it has boiled three minutes, and put in the charcoal; bring it to boil anew, and two minutes after pour in the albuminous water in three portions; shake it each time, and the ebullition being sustained for two minutes longer, withdraw it from the fire; allow it to cool; filter it through flannel until it pass colourless. The residuum, washed with warm water, serves for a new process: 280 parts of honey, treated in this manner, yield 265 of syrup.

HONEY OF BORAX.

Take of Borax, powdered, a drachm,
Clarified Honey, an ounce.—Mix.

REMARKS.—This is an agreeable mode of applying borax to aphthæ of the tongue or mouth; and dissolved in water it forms a useful gargle in cases of mercurial

salivation. It is now introduced for the first time into this Pharmacopœia.

ROSE HONEY.

Take of Petals of the Red Rose Buds, dried and freed from their claws, four ounces.

Boiling Water, three pints,
Honey, *by weight*, five pounds.

Macerate the petals in water for six hours: mix the honey with the liquor previously filtered, and boil it down to the consistence of a syrup, removing the scum.

REMARKS.—In making this preparation the clarified honey, as above directed, ought to be used.

MEDICAL PROPERTIES AND USES.—It is slightly astringent, and is chiefly used as an adjunct to detergent or astringent gargles, and sometimes as a vehicle for other remedies, in the disorders of children.

OXYMEL.

Take of Honey, *by weight*, two pounds,
Distilled Vinegar, a pint.

Boil them in a glass vessel, with a slow fire, to the thickness of a syrup, removing the scum.

REMARKS.—In this preparation also, the clarified honey ought to be preferred.

MEDICAL PROPERTIES AND USES.—Detergent, principally used as the basis of gargles and expectorant remedies; mixed with barley water it forms a grateful and cooling beverage in fevers and inflammatory affections;

when frequently taken in small quantities it is very effectual in allaying the tickling in the throat caused by a common catarrh.

OXYMEL OF MEADOW SAFFRON.

Take of fresh bulb of Meadow Saffron, cut into thin slices, an ounce,
Distilled Vinegar, a pint.
Clarified Honey, *by weight*, two pounds.

Macerate the meadow saffron with the vinegar in a glass vessel for two days: to the liquor, strongly expressed from the root and filtered, add the honey, and then boil down the mixture to the consistence of a syrup, frequently stirring it with a wooden rod.

REMARKS.—This preparation is ordered only by the Dublin College. It is an active remedy, but as the active matter of the colchicum is apt to be injured by boiling, its strength is uncertain.

MEDICAL PROPERTIES AND USES.—It is expectorant and diuretic, and is used in gout, dropsy, and humoral asthma.

DOSE.—One drachm gradually increased to two drachms twice in the day.

OXYMEL OF SUBACETATE OF COPPER OR VERDIGRIS.

Take of Prepared Verdigris, an ounce,
Distilled Vinegar, *by measure*, seven ounces,
Clarified Honey, *by weight*, fourteen ounces.

Dissolve the verdigris in the vinegar and filter through

linen : add the honey, and boil it down to a proper thickness.

REMARKS.—In the former edition of this Pharmacopœia, this preparation is called *Oxymel Æruginis*. In the London Pharmacopœia it is called *Linimentum Æruginis*. It is the *Mel Egyptiacum* of the older writers.

MEDICAL PROPERTIES AND USES.—It is an active detergent and mild escharotic. In a diluted state it is recommended as an application to venereal ulcerations of the mouth and tonsils; but care should be taken that none of it be swallowed, and the mouth should be washed after using it. It is a domestic remedy against suppurated chilblains.

Verdigris is said to be the active ingredient in *Smellome's Eye Salve*.

OXYMEL OF SQUILL.

Take of Clarified Honey, *by weight*, three pounds,
Vinegar of Squill, two pints.

Boil them in a glass vessel with a slow fire, to the thickness of a syrup.

REMARKS.—When this oxymel has been kept for a considerable time it deposits a precipitate, having the aspect of crystallized honey, which Vogel found to consist of citrate of lime, tannin, and honey.—*Ann. de Chim.* vol. lxxxiii. p. 157.

MEDICAL PROPERTIES AND USES.—It is expectorant, diuretic, aperient, and in larger doses emetic, with which intention it is often given in hooping cough; it is useful in asthma and coughs as an expectorant; as it is apt to excite nausea it is best given in cinnamon water, or other aromatic vehicle.

DOSE.—Half a drachm to two drachms.

CONFECTIONS AND CONSERVES.

REMARKS.—Under these two titles are included preparations in this Pharmacopœia, which are so entirely similar in their construction, that they might with equal propriety and less confusion have been included under one denomination.

The mode adopted by the London College is still more faulty; for under the term CONFECTIONS they include not only conserves, but also electuaries, which are in many respects preparations very differently constituted.

Confections or conserves consist in general of fresh vegetable matters beat into a uniform mass with refined sugar; and are intended to preserve, as nearly as possible, unaltered, the virtues, or properties, of recent vegetables, and to prevent the decomposition to which they would otherwise be liable.

They should be kept in closely covered jars in order to preserve their proper degree of moisture; the London College directs, that when they have become hard from long keeping they are to be moistened with water, so as to restore their proper consistence.

 CONFECTION OF ALMONDS.

Take of Sweet Almonds, an ounce,
 Gum Arabic, powdered, a drachm,
 Refined Sugar, half an ounce.

Having peeled the almonds, previously macerated in water, beat them up with the gum and sugar until they are well mixed.

REMARKS.—With the addition of a few bitter al-

monds, this confection affords a very convenient paste for the formation of the *Mistura Amygdalarum*. For this purpose the paste so made should be used in the proportion of a drachm to each fluid ounce of distilled water.

AROMATIC CONFECTION.

Take of Cinnamon Bark,
 Nutmegs, of each two ounces,
 Cloves, an ounce,
 Cardamom Seeds, half an ounce,
 Saffron dried, two ounces,
 Prepared Chalk, sixteen ounces,
 Refined Sugar, powdered, two pounds,
 Water, a pound.

Rub the dried substances into a very fine powder, then add the water by degrees, and beat them into a pulp.

MEDICAL PROPERTIES AND USES.—It is stimulant and cordial, forming an agreeable and useful adjunct to or vehicle for more active remedies; but owing to the presence of the carbonate of lime, it must not be prescribed in combination with acids, acidulous salts, or metallic solutions, as their properties would be thereby changed.

DOSE.—One scruple to one drachm or more.

CONFECTION OF OPIUM.

Take of Hard Opium, powdered, six drachms,
Long Pepper, an ounce,
Ginger Root, two ounces,
Caraway Seeds, three ounces,
Gum Tragacanth, powdered, two drachms.
Syrup, a pound.

Rub the opium with the syrup previously heated, then add the other ingredients in powder, and mix.

REMARKS.—This confection is now introduced for the first time into this Pharmacopœia, and is copied from that of the London College. It is intended as a substitute for the mithridate and theriaca of the older Pharmacopœias, farragoes consisting of above an hundred ingredients, among which opium appears to be the predominant agent. Twenty-five grains contain about a grain of opium.

MEDICAL PROPERTIES AND USES.—It is stimulant and narcotic, and is given with advantage in flatulent colic, and in colliquative diarrhœa with the chalk mixture.

DOSE.—Ten grains to one drachm.

CONFECTION OF BLACK PEPPER.

Take of Black Pepper,
Elecampane Root, of each a pound,
Fennel Seeds, three pounds,
Honey,
Refined Sugar, of each two pounds.

Rub the dry substances together into a very fine powder; then adding the honey, beat them into a uniform mass.

REMARKS.—This is now first introduced into this Pharmacopœia from that of the London College: Its composition is said to resemble very closely that of *Ward's Paste for Piles*.

M. Œrstaedt discovered in black pepper a peculiar crystalline substance, to which he gave the name of *Piperine*, and which he supposed to be a vegetable alkali: this supposition was subsequently proved to be erroneous by M. Pelletier, who found that piperine bears much analogy with the resin of cubebs, which M. Vauquelin compares with the balsam of copaiba: the resin in cubebs, however, does not possess any crystalline property.

Piperine has also been found to exist in long pepper, from which it was obtained by M. Dulong, whose analysis of long pepper, as he remarks, so nearly identical with that of black pepper by Pelletier and Poulet, and having so many relations also with that of cubebs by Vauquelin, is another proof supplied by vegetable analysis of the truth of that remarkable principle, which Linnæus has so well expressed in his Dissertation on Plants, “*Plantæ quæ genere conveniunt, virtute etiam conveniunt;*” this principle has been recently more fully developed by Decandolle in his “*Essai sur les Propriétés Médicales des Plants, comparées avec leurs Formes Exterieures.*”

According to Bertini, Meli, and others, *Piperine* is a most energetic febrifuge, particularly in the cure of intermittents, which it is said to accomplish with as much certainty and in as short a time as the sulphate of quinine, and in smaller doses.

MEDICAL PROPERTIES AND USES.—It is a hot sti-

mulant and carminative, and when given for the cure of piles, may be of service in cases where debility and torpor of the intestines exist; but on the other hand, in an irritable habit, with inflammatory symptoms, it could hardly fail to do harm.

DOSE.—From one drachm to two twice or thrice a day.

CONSERVE OF ROSES.

Take of the Petals of the Red Rose buds, rejecting
the claws, a pound,
Refined Sugar, three pounds.

Beat the petals in a stone mortar: then having added the sugar, beat them till they are intimately mixed.

REMARKS.—This is a convenient vehicle for making up pills or electuaries; its taste is agreeable, and it keeps well. Dr. Paris says, that it is sometimes brightened by the addition of sulphuric acid; a circumstance of serious importance where this conserve is used in making the *Pilulæ hydrargyri*, which see.

CONSERVE OF RUE.

Take of Common Rue Leaves,
Caraway Seeds,
Berries of sweet Bay, of each an ounce and
a half,
Sagapenum, half an ounce,
Black Pepper, two drachms,
Clarified Honey, sixteen ounces.

Rub them together into a very fine powder, and then adding the honey, mix them well.

REMARKS.—This confection is now introduced for the first time into this Pharmacopœia, and includes the greater number of the ingredients of the *Electuarium e baccis Lauri* of the London Pharmacopœia of 1720, which was first introduced by Rhasis for the cure of colics and pains in the bowels; it was long supposed to be a valuable antihysterical and emmenagogue.

MEDICAL PROPERTIES AND USES.—It is used as an antispasmodic, stimulant, and carminative, but is now confined to administration in enemata, from one scruple to one drachm mixed in half a pint of gruel being administered in the convulsive affections of infants, arising from flatulence and other intestinal irritations, and in flatulent colic. But as it may inflame the mucous coat of the intestines, particularly in infants, it should be used with caution. It is not improbable, as remarked by Dr. A. T. Thomson, that this confection might be given with advantage in cases likely to be benefited by prussic acid, which is the active principle of the laurel berries.

DOSE.—Ten grains to one scruple.

SYRUPS.

When no mention is made either of weight, or the mode of dissolving, syrups are to be prepared according to the following rule:

Take of Refined Sugar, finely powdered, twenty-nine ounces,

The Liquor prescribed, a pint.

Add the sugar by degrees, and digest it with a me-

dium heat in a covered vessel, frequently shaking it until it is dissolved; then set it aside for twenty-four hours, remove the scum, and pour off the syrup from the fæces, if there be any.

REMARKS.—Owing to the great tendency of syrups to spoil by fermentation, a variety of means have been proposed to prevent its occurrence.

Dr. M'Culloch, in his Essay on Wine, informs us, that this may be accomplished by the addition of a small quantity of *sulphate of potash*, or of *oxymuriate of potash*, which is a tasteless salt.

As some objections might be made to the employment of these salts, M. Chereau proposes, as a more innocent one, which has often succeeded with him, the sugar of milk, which has a sweet taste, and is not susceptible of fermentation. The proportions are 32 to 1000 of syrup: he adds, that the property which the conserve of Hamech has of keeping a long time without alteration, is ascribed by Baumé to this substance.

Syrups which have been well clarified, and are kept in bottles quite full and closely stopped, are less liable to ferment; and Virey found that even when fermentation had commenced, it might be suspended by the addition of a small quantity of alcohol. According to Dr. A. T. Thomson, the most certain test of the proper consistence of a syrup is its specific gravity, which, when cold, should be 1.385.

A warm situation greatly promotes the fermentation of these preparations: the London College directs that they should be kept in a place whose temperature never exceeds 55° of Fahrenheit.

SYRUP OF MARSH-MALLOW.

Take of fresh Root of the Marsh Mallow, bruised,
half a pound,
Refined Sugar, two pounds.
Water, four pints.

Boil the water with the root down to one half, and express the liquor when cold; lay it aside for twenty-four hours, that the fæces may subside; then pour off the liquor, and having added the sugar, boil down to a proper consistence.

REMARKS.—This syrup is very liable to ferment and spoil.

MEDICAL PROPERTIES AND USES.—It is demulcent, and is chiefly used in nephritic cases and for sweetening emollient decoctions, or as an ingredient in cough mixtures: it possesses very little, if any, activity.

DOSE.—One drachm to half an ounce.

SYRUP OF ORANGE PEEL.

Take of fresh outer rind of Seville Orange, eight ounces,
Boiling Water, six pints.

Macerate for twelve hours in a covered vessel; then having filtered the liquor, dissolve the sugar in it to form a syrup.

REMARKS.—The sugar should be powdered, and dissolved in the liquor with as low a heat as possible to prevent the exhalation of the volatile parts of the orange

peel. A syrup, equally agreeable and efficacious, may be made by adding an ounce of tincture of orange peel to a pint of simple syrup.

MEDICAL PROPERTIES AND USES.—It is stomachic. On account of its aromatic flavour it is much used as an adjunct to stomachic mixtures.

DOSE.—One drachm to three.

SYRUP OF BALSAM OF TOLU.

Take of Simple Syrup, a pound and a half,
Tincture of Balsam of Tolu, an ounce.

With the syrup just prepared, when it has almost grown cold, after being removed from the fire, mix the tincture by degrees, with constant agitation.

REMARKS.—This syrup is now introduced for the first time into this Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is used to impart an agreeable flavour to cough mixtures and draughts, &c.

DOSE.—One drachm to four.

SYRUP OF LEMONS.

Take of juice of fresh Lemons, two pints.

As soon as the fæces have subsided put the juice into a matrass, and subject it for a quarter of an hour to the heat of boiling water; when cold pass it through a sieve and form a syrup.

MEDICAL PROPERTIES AND USES.—It is cooling, and gives an agreeable acidulous taste to barley water

and other drinks in inflammatory affections. It is also a useful addition to gargles.

DOSE.—One drachm to four.

SYRUP OF WHITE POPPY.

Take of the Capsules of the White Poppy, dried and bruised, after taking out the seeds, seventeen ounces,
Boiling Water, two gallons.

Macerate the capsules in the water for twenty-four hours, then boil down to one gallon in a water bath, and strongly express the liquor. After straining this liquor boil it down again to two pints, and filter it while it is yet hot. Set it aside for twelve hours that the fæces may subside, then boil down the defæcated liquor to a pint, and form a syrup.

REMARKS.—In the former edition of this Pharmacopœia this was called *Syrupus Papaveris Albi*; the quantity of water there ordered, three pints, was found totally insufficient, and has been here considerably increased; and the process also has been somewhat changed.

The seeds are rejected, as they possess none of the medicinal properties of the plant.

This preparation may be very well made without using the water bath, as the agitation of boiling will keep the capsules constantly in motion, and prevent burning by their resting on the bottom of the boiler.

This syrup has the advantage of being free from the disagreeable taste of opium, but it is liable to great variation in its strength, and should be kept in a cool place, as it is particularly apt to ferment and spoil; this, according to Virey, may be prevented by clarifying it with

white of eggs, by which process, however, the syrup is deprived of some of its virtue, and its dose must in consequence be increased.

In the former edition of this Pharmacopœia there was ordered a syrup of opium, made by dissolving the watery extract of opium in syrup, in such proportion that each fluid ounce of the syrup contained about a grain of the extract: as this was a very convenient formula, and always of uniform strength, its omission now, is to be regretted.

A syrup of morphine is now used in Paris, which is said, with the advantage of having a uniform strength, and being certain in its effects, to possess the sedative powers of opium without producing the nervous and functional disturbance which so generally follows the use of that drug. It is thus prepared:

Take of Acetate or Sulphate of Morphine, four grains.

Perfectly Clarified Syrup, a pound.—Mix.

Dose.—One ℥i. or ℥ii. every three hours.

MEDICAL PROPERTIES AND USES.—It is narcotic, sedative, and anodyne. It is useful in allaying cough, easing pain, or procuring sleep in the disorders of children, and is too often found as a panacea in the nursery; but this is every way objectionable, as it is at all times liable to great uncertainty in its strength and narcotic powers; but in such a heated situation it is particularly apt to run into fermentation, in which state it should never be given; and being a preparation the activity of which is often unsuspected, it is given with a degree of carelessness too often productive of not only dangerous, but even of fatal consequences. I have been informed of more than one instance, in which a tea-spoon full has been known to prove fatal to a healthy infant. A practice which exists in the shops, of substituting for this syrup, one made by adding tincture of opium to simple

syrup, adds considerably to the danger and uncertainty always attending its administration to children. I was lately informed of a case occurring in this city, in which the life of a very fine child fell a sacrifice to such irregularity in the composition of this medicine; and still more recently in Liverpool, two twin children of eleven months old, died in a few hours, in consequence of taking a tea-spoon full each of a syrup so prepared, which, by the acknowledgment of the druggist who sold it, consisted of two drachms of syrup and half a drachm of tincture of opium; so that each of the unfortunate infants must have taken at least ten or twelve drops of the tincture: the vender of the medicine was obliged to stand his trial for the offence.

DOSE.—From half a drachm to one ounce, according to the age of the patient.

SYRUP OF RED POPPY.

Take of fresh petals of the Red Poppy, a pound,
Boiling Water, *by measure*, twenty ounces.

Add the petals gradually to the boiling water: then having removed the vessel from the fire, macerate with a low heat for twelve hours; then express the liquor, and set it aside that the fæces may subside; lastly, add the sugar, and form a syrup.

REMARKS.—In the former edition of this Pharmacopœia, this was called *Syrupus Papaveris Erratici*. It has a very fine red colour, which is its only value; it is very liable to ferment and spoil.

The object of putting the flowers into boiling water, is to cause them to shrink, so as to be all immersed in the water, which could not otherwise be accomplished:

but they are not to be kept over the fire after this is effected, lest the liquor become too thick, and the syrup be rendered ropy.

SYRUP OF BUCKTHORN.

Take of the fresh juice of Buckthorn berries, two pints
and a half,
Ginger Root, sliced,
Pimenta Berries, bruised, of each three
drachms.

Set the juice aside that the fæces may subside, and then filter it; add the ginger and pimenta berries to ten ounces of the defæcated juice; macerate for twenty-four hours, and filter; boil down the remaining liquor to a pint, mix the liquors, and form a syrup.

REMARKS.—This syrup is now introduced for the first time into this Pharmacopœia. It is the *Syrupus de Spinâ Cervinâ* of the London Pharmacopœia 1720.

The berries of the *Sambucus nigra*, and of the *Cornus sanguinea*, or dogberry, are often mixed with, or substituted for those of the buckthorn. This abuse may be detected by opening the berries, those of the buckthorn having *four seeds*, of the elder *three*, and of the dogberry only *one*.

MEDICAL PROPERTIES AND USES.—It is cathartic, but so unpleasant both to the taste, and in its operation, that it is very seldom used. In France it is added to enemata.

“It is a fact, that syrup of buckthorn is much less frequently used than formerly, and it may be inferred from this, that physicians have no longer found it as

quick in its effects, notwithstanding what Schwilgué has said of it, *Traité de Mat. Med.* vol. ii. page 454.

“ Besides, there were formerly employed three parts of juice of buckthorn, purified, to two of sugar, with the intention of rendering the same volume more purgative. Equal parts are now prescribed. The action of the heat is no doubt to be feared, but it is probable that it was to syrup of buckthorn, *prepared with its first proportions*, that Sydenham, on entering his medical career, owed his success.”—*Chereau and Robiquet*.

DOSE.—Half an ounce to an ounce.

SYRUP OF ROSES.

Take of the dried petals of the hundred-leaved Rose,
seven ounces,
Boiling Water, four pints.

Macerate the petals in the water for twelve hours, and filter; evaporate the filtered liquor in a water bath down to two pints and a half, then add the sugar, and form a syrup.

REMARKS.—This syrup is now introduced for the first time into this Pharmacopœia. It is the *Syrupus Rosarum Solutivus* of the London Pharmacopœia 1745.

MEDICAL PROPERTIES AND USES.—It is gently laxative, and with such intention is given to young children; but if made, as is sometimes the case, with the petals of the red rose, it will possess astringent instead of laxative properties. It has a fine red colour, which is heightened by acids, but changed to green or yellow by the alkalies.

DOSE.—Two drachms to one or two ounces.

SYRUP OF SARSAPARILLA.

Take of Sarsaparilla Root, sliced, a pound,
Boiling Water, a gallon.

Macerate the root in the water for twenty-four hours ; then boil down to four pints, and filter the liquor while it is yet hot ; then form a syrup in the manner before directed.

REMARKS.—This syrup is now introduced for the first time into this Pharmacopœia. It is a convenient and portable form for the administration of sarsaparilla : Mr. Brande says it is not liable to ferment, and that it is improved by the addition of a few cloves.

MEDICAL PROPERTIES AND USES.—Slightly diaphoretic, tonic, and demulcent ; it is chiefly used in conjunction with the decoction, as an alterative in the secondary attacks of the venereal disease.

DOSE.—One drachm to four.

SIMPLE SYRUP.

Take of Refined Sugar, finely powdered, twenty-nine
ounces,
Water, a pint.

Add the sugar gradually to the water, and digest it with a medium heat in a close vessel until it is dissolved, frequently stirring it ; afterwards pour it off from the dregs, if there be any.

REMARKS.—This is now, for the first time, made a separate formula by the Dublin College.

Simple syrup should be clear, free from colour, and

transparent; it is a very convenient form for sugar in many pharmaceutical preparations, saving the time and trouble of weighing and dissolving the solid substance.

SYRUP OF VIOLETS.

Take of the fresh petals of the Violet, two pounds,
Boiling Water, five pints.

Macerate for twenty-four hours; then filter the liquor through fine linen, without expression; lastly, add the sugar and form a syrup.

REMARKS.—By a process similar to that used for procuring emetine, M. Boullay has lately obtained from the *viola odorata* a principle possessing similar properties, which has been named *violine*; this may account for any medicinal activity which this syrup may be found to possess: its colour constitutes its chief value, and this is often counterfeited, but the fraud is very easily detected by adding to the suspected syrup a very small quantity of acid or alkali, of both of which it is a very delicate test: if the syrup be genuine its blue colour will be changed by the acid to red, and by the alkali to green; but if it be counterfeited these changes will not take place, except the juice of red cabbage have been used, which fraud is a very harmless one.

“Pewter deepens or brightens the colour of violets in a remarkable manner, and therefore vessels made of that metal are to be preferred for making the infusion: they must be well cleaned before they are used. Berthollet says, that in the colouring matter of violets, there is an acid which develops itself spontaneously, and that the pewter absorbs it.

“The cause may be doubted, but the effect cannot be

denied, when the flowers are observed by remaining in pewter, to furnish the most beautiful blue colour.”—*Chereau and Robiquet*.

Chevallier proposes the following rules for obtaining a well prepared syrup of violets: 1st, to use the cultivated violets, in preference to those which grow wild and have a reddish colour; 2d, to use those which blow in spring, and are most odorous; 3d, to prepare the infusion as soon as the flowers are cleaned; 4th, to use a very clean pewter vessel; 5th, to employ sugar free from lime, which would turn the colour of the violet to green. *Dict. de Drogues Simp. et Comp.* vol. iv. p. 597.

MEDICAL PROPERTIES AND USES.—It is gently laxative to children, but its principal use is as a test.

DOSE.—One drachm to two drachms.

SYRUP OF GINGER.

Take of Ginger Root, bruised, four ounces,
Boiling Water, three pints.

Macerate for twenty-four hours; then, having filtered the liquor, add the sugar, and form a syrup.

REMARKS.—A preparation containing more of the pungency of the ginger may be made by adding tincture of ginger to simple syrup.

MEDICAL PROPERTIES AND USES.—It is cordial, stomachic, and carminative; when sufficiently impregnated with the qualities of the ginger, it is an excellent adjunct to bitter or tonic mixtures and to griping purgatives.

DOSE.—One drachm to three or four.

INSPISSATED JUICES.

The leaves used in the preparation of inspissated juices should be gathered about the time of the flowering of the herb, when the flowers are just beginning to appear. The inspissation of the juices will be best effected by abstracting the superfluous moisture with a medium heat, obtained by means of the vapour of boiling water, and by constantly stirring them with a spatula towards the close of the evaporation.

REMARKS.—See remarks on the simpler extracts.

INSPISSATED JUICE OF MONKS-HOOD.

Take of the fresh leaves of Monks-hood, a pound.

Having moistened the leaves with water, pound them in a mortar. Then express the juice, and without defæcation reduce it to a proper consistence in the manner already mentioned.

REMARKS:—This is now introduced for the first time into this Pharmacopœia. It is similar to the *Extractum Aconiti* of the London College. Under this form it was first introduced into practice by Dr. Stöerk. According to M. Brandes, the activity of monks-hood depends on an alkaline principle, which has been named *Aconitine*; care should be taken always to use the fresh leaves, as the activity of any preparation of monks-hood will vary very considerably, according to the length of time the leaves have been gathered before using.

According to Mr. Brande, one hundred weight of fresh leaves yield about five pounds of extract.

MEDICAL PROPERTIES AND USES.—It is narcotic, and in some cases diuretic; it has also been found to produce diaphoretic effects. It is given in chronic rheumatism, intermittent fever, glandular swellings, and convulsive affections. Dr. Duncan says, that he has “lately used it with decided, though not always permanent success, in some cases of sciatica.” The administration of monkshood requires great caution, as it occasionally produces very violent effects, while on the other hand it sometimes appears totally inert.

DOSE.—Half a grain at first; increased afterwards to six or eight grains.

INSPISSATED JUICE OF DEADLY NIGHTSHADE

Is to be prepared in the same manner from the fresh leaves of the Deadly Nightshade.

REMARKS.—This is now introduced for the first time into this Pharmacopœia. It is the *Extractum Belladonnæ* of the London Pharmacopœia, and according to Mr. Brande, one hundred weight of fresh Belladonna yields from four to six pounds of extract. By the analysis of M. Brandes, it appears that the activity of Belladonna depends on a peculiar alkaline principle, which has been named *Atropia* or *Atropine*, which is found to exist in the plant in the form of a *malate*.

MEDICAL PROPERTIES AND USES.—Belladonna is powerfully narcotic, diaphoretic, and diuretic. It excites all the excretions, and has been found serviceable in neuralgia, used internally, and applied externally in the form of a plaster.—See *Belladonna Plaster*.

MM. Schaeffer, Hufeland, and Wetzler, have declared it almost a specific in hooping cough, and to its efficacy

in this complaint Dr. A. T. Thomson also bears testimony. Wetzler succeeded in curing all his cases within twenty days from the time the patients began to use the Belladonna: the greater number were cured, from the eighth to the fifteenth day. In two cases in which I administered it for this complaint, it appeared to succeed completely, and removed the complaint from one child in a fortnight, and from the other in about three weeks. I used the extract dissolved in cinnamon water, and sweetened with syrup.

On the continent, Belladonna was for a time much extolled as a preventive of hydrophobia; but recent failures, in cases where it was fairly tried, have invalidated, if not annulled its claim to such a power. It is also upheld by many, particularly of the continental physicians, as a preventive against the infection of scarlatina, during epidemics of that disorder; and its pretensions in this respect are supported by so many respectable authorities, that we can hardly doubt of their being well grounded.

Dr. Berndt, of Custrin, who was the first to make a connected series of experiments on the subject, says, that in the epidemics of scarlatina which prevailed throughout that city in 1818 and 1819, he used the Belladonna as a preservative in children under fifteen years of age, who were freely and continually exposed to the contagion; that out of 195 cases, only *fourteen* were infected; and that when he afterwards used a stronger preparation of the drug, every one escaped the disease. Koreff, professor at Berlin, affirms, from a very extensive experience and observation of sixteen years, that the most intimate intercourse may be kept up with patients affected with scarlatina, provided the Belladonna be taken in the proper doses for eight or nine days before exposure, and be continued till the period of desquamation; on this subject he has lately addressed a letter to

M. Laennec, in which he says, "it was not till I had received the authority of the celebrated Söemmering, who informed me, that he obtained the most satisfactory results with it when the disease raged epidemically, that I determined to employ it;" and he adds, "up to the present time, April 1824, neither season, nor locality, nor any other circumstance, has appeared to diminish the preservative effect of this plant." In addition to these testimonies, may be added that of Hufeland, who says in the *Journal der Practischen Heilkunde*, Nov. 1825, that "it gives him great joy to be able to confirm, by the results of fresh experience, the efficacy of Belladonna as a preventive against scarlet fever; and he adds, that having repeatedly used the medicine in his own practice, he has never seen it fail in a case where it had been properly tried." To these might be added, if necessary, the opinions of several others to the same effect.

The preparation employed was a solution of two or three grains of the extract in an ounce of cinnamon water; of this two or three drops were given twice a day to children under a year old; one drop more was added for every year above that. The principle on which it is given is, that diseases are to be combated by the exhibition of remedies which produce symptoms similar to those of the disease for which they are given, and on this principle Belladonna was first suggested as a preventive of scarlatina in 1807, by Dr. Hahnemann, of Leipsic.

Belladonna has been long used as an application to the eye previous to performing the operation of cataract; the extract is rubbed freely over the eye-lids and eye-brow, and in about an hour afterwards, if there be no adhesions of the iris to other parts, a full dilatation of the pupil takes place, bringing the whole of the cataract distinctly into view, and thereby materially facilitating the operation. Belladonna was also applied by the late Mr. John Cunningham Saunders, after the ope-

ration, with a view of preventing the iris from becoming adherent to the edges of the torn capsule. This practice is also adopted by Dupuytren under similar circumstances. Mr. Saunders also strongly recommends a similar application to prevent obliteration of the pupil occurring as a consequence of inflammation of the iris. "Happily," says he, "we are furnished in the extract of Belladonna, with a perfect specific for this purpose."—See his Treatise, page 63.

The action of this substance in such cases, appears to be limited to the radiated fibres of the iris. M. Segalas read a Paper before the Royal Academy of Medicine in Paris, on the manner in which Belladonna acts when applied to the eye. Having placed on the eye of a young cat, a grain of the extract of Belladonna, he saw the dilation of the pupil begin *fourteen* minutes afterwards. Having in a second experiment placed a grain on the pleura of a cat, of the same age and the same height, the dilatation commenced in *eight* minutes. Lastly, in a third experiment, having injected a grain into the bronchial vessels, the dilatation appeared in *two* minutes after, that is to say, seven times quicker than after the direct application of the substance to the eye.

It would seem then, says M. Segalas, that the dilatation of the pupil is quick in proportion as the Belladonna is applied to a surface, possessing a greater or less degree of absorbing power; from which it would result, that the Belladonna only acts on the eye after being absorbed and carried by the blood to this organ. It is to be regretted, however, that his experiments were deficient in such a degree of accuracy as would warrant a very precise inference.

Dupuytren, after a continued use of Belladonna internally for the space of ten years, is perfectly convinced of its efficacy in long standing cases of scrofulous ophthalmia.

In parturition, rendered lingering by rigidity of the os uteri, Chaussier recommends the application of the extract to the part, as tending to produce relaxation; and in a small pamphlet on the subject, he has published some cases in which it was successfully used. His formula is the following:

R Extracti Belladonnæ drachmas duas
Cerati Simplicis unciam.—Commisce.

Dr. Conquest, of London, says he has seen decided benefit result from such a practice. I have never seen it tried for such a purpose. I was lately informed of a case of impaction of a calculus in the gall duct, in which instantaneous and complete relief was given by rubbing Belladonna over the seat of the pain; it induced spasms in the face which soon subsided; the preparation used was an infusion of a drachm of the powdered leaves diffused through an ounce of water. Dr. Paris informs us, that an ointment composed of equal parts of the powdered leaves and of lard “rubbed over the penis prevents priapism, and relieves chordee more effectually than any application which has been proposed.”

Great caution is required in the administration of Belladonna, as it is likely to bring on most distressing and alarming symptom if injudiciously or incautiously given, or when it is taken for a considerable time, even in small doses, it is apt to induce a dryness and stricture of the fauces, pharynx, and œsophagus; vertigo, dimness of vision and dilated pupil; upon the occurrence of any of which symptoms its use should be discontinued for the time. The root of the plant produces somewhat similar effects, but of a milder character, and resembling intoxication; this is alluded to by Shakspeare in his Macbeth:

“Or have we eaten of the *insane root*
That takes the reason prisoner.”

When an over dose has been taken an active emetic of sulphate of zinc or copper, should be given, purgatives administered, and afterwards vinegar: the influence of Belladonna on the stomach is so paralyzing that it is often impossible to excite vomiting; in such cases, vinegar is recommended in the first instance, after which emetics are said to be more likely to produce their effect.

DOSE.—One-fourth of a grain gradually increased to five grains.

INSPISSATED JUICE OF HEMLOCK

Is to be prepared in the same manner from the fresh leaves of the common hemlock.

REMARKS.—In the former edition of this Pharmacopœia, hemlock was ordered by the name of *Cicuta*, but as the use of that term might lead to the mistake of using the *Cicuta Virosa*, particularly in countries where that plant is frequent, it was judged advisable to give the plant the proper systematic name. This preparation is similar to the *Extractum Conii* of the London Pharmacopœia. According to Dr. Withering and others, the leaves should be gathered for medical use about the end of June, when the plant is in flower; the small leaflets picked off and the footstalks thrown away. Dr. Fothergill, however, recommends a later season for so doing; in his opinion, the proper time is “just when the flowers fade, the rudiments of the seeds become observable, and the habit of the plant inclines to yellow.”

Mr. Brande proposes as an improvement in the mode of making this preparation, “to heat the juice immediately after its expression, to its boiling point; then to

strain, evaporate, and when it becomes nearly of a proper consistency, to add the feculent matter remaining upon the strainer, which in "this way escapes long exposure to heat." One hundred weight of hemlock yields about four pounds of extract.

In general the activity of hemlock is found to be proportioned to the heat and dryness of the season. In the southern climates of Europe, as in Greece, Italy, and Spain, its poisonous qualities are much more intense than in the more northern latitudes. We are even assured, on the authority of a distinguished Russian botanist, M. Steven, that in some places, as for instance in the Crimea, in the neighbourhood of Odessa, the peasants eat hemlock with impunity after having boiled it in several waters.—*Richard. Dict. de Drogues Simp., &c.* vol. ii. p. 132.

Dr. Maton considers the value of this preparation greatly increased by including the seeds in its composition.

MEDICAL PROPERTIES AND USES.—It is narcotic, sedative, alterative, and resolvent; and is used in scrofula, schirrus, and cancer, particularly that of the uterus, the pain of which it allays without producing the constipation so generally accompanying the use of opium. From the eulogiums of Stöerck, it was hoped that in hemlock we had at length a remedy for this and other forms of cancer, but experience has shewn that it possesses no power whatever over the disease, except that of mitigating pain. It is recommended in hooping cough and the protracted cough which sometimes remains after pneumonic inflammation, in such cases Dr. Paris strongly recommends its use combined with hyoscyamus, as in the following formula, from which he has derived the greatest benefit:

℞ Extract : Conii

Extract : Hyoscyami ā ā gr. v.

Mucilag : Acaciæ ℥ii.

Tere simul, donec quam optime misceantur et
deinde adde.

Liquor : Ammon. Acetat.

Aquæ puræ ā ā ℥ss.

Syrupi Rhœadis ℥i.

Fiat haustus quartâ quâque horâ sumendus.

The same combination has been also found to afford very great relief in phthisis pulmonalis. This preparation of hemlock should be used as fresh as possible, as its virtues are impaired by keeping, being, according to Dr. A. T. Thompson, nearly lost when a saline efflorescence begins to appear on its surface: Pfaff says, that nitre is frequently found crystallized in this preparation. In case of an overdose, full vomiting should be excited by sulphate of zinc, and afterwards vinegar should be given liberally: bleeding may also be found necessary.

DOSE.—From one grain to twenty.

INSPISSATED JUICE OF HENBANE

Is to be prepared in the same manner from the fresh plant of henbane.

REMARKS.—The improvement proposed by Mr. Brande in the mode of preparing extract of hemlock, will equally apply to this preparation, see page 484. According to Virey, the quantity of extract obtained from henbane is one-nineteenth of the whole; Mr. Brande states it to be only between four and five pounds from one hundred weight of the fresh plant.

MEDICAL PROPERTIES AND USES.—Similar to those

of the tincture of henbane, *which see*; to the remarks given under that head may be added, that henbane, as well as Belladonna, has the property of dilating the pupil of the eye, and is sometimes used for that purpose, preparatory to the operation for cataract. We are informed by Dr. Paris, on the authority of Sir Henry Hallford, that he has found extract of hyoscyamus a valuable addition to compound extract of colocynth, the operation of which it renders much more mild and no less efficacious; and such a combination has been found particularly serviceable in colica pictonum.

Mr. Brande says, that “ independent of its more ordinary uses, he found henbane of much service in allaying the irritation occasioned by red sand in the kidneys, the constipation produced by opium being in such cases very prejudicial: it may be administered with alkaline and diuretic remedies.”

In a paper lately published by Mr. Benjamin Bell, on the treatment of gonorrhœa, he strongly recommends a combination of camphor and hyoscyamus for the relief of “ severe chordee, attended with spasm of the cervix vesicæ;” for which he has prescribed in the course of the twenty-four hours, one drachm of the former in combination with two scruples of the latter. “ In general,” says he, “ half the above quantity will be found sufficient; and the rule to be observed in giving them is very simple; for on the occurrence of the slightest symptoms of vertigo, their exhibition should be suspended.”

Edin. Jour. Med. Science, vol. i. p. 79.

Dose.—From one grain to twenty.

INSPISSATED JUICE OF ELDER

Is to be prepared in the same manner from the ripe berries of the common Elder, fresh gathered.

REMARKS.—The berries ripen in September, and yield on expression a fine purple juice; and according to M. A. Chevallier, paper stained with this juice is as delicate a test of alkalies and acids as litmus. This preparation is vulgarly called *Elder Rob.*

In this, as well as in many other instances, the quantity of extract obtained depends much on the dryness or moisture of the season, for in moist seasons, Baumé obtained five pounds of inspissated juice from thirty pounds of elder berries, whereas in dry seasons, he could rarely get more than two pounds from the same quantity.

MEDICAL PROPERTIES AND USES.—It is cooling, laxative, and diuretic. Diluted with water it forms a cooling beverage in febrile and inflammatory affections. Considerable efficacy was attributed by Boerhaave and others of the older physicians to preparations of elder, but at present they have fallen into disuse. Lewis says, that this preparation “proves an useful aperient and resolvent in recent colds and sundry chronical disorders, gently loosening the belly, and promoting urine and perspiration.”—*Mat. Med.* vol. ii. p. 227.

DOSE.—One or two drachms, diluted with water.

EXTRACTS.

SIMPLER EXTRACTS.

All simpler extracts, unless it be otherwise directed, are to be prepared according to the following rule: boil the vegetable matter in eight times its weight of water, until the liquor is reduced to one half; then express the liquor, and when the fæces have subsided, filter; evaporate with a *superior* heat, until it begins to thicken; and finally inspissate it, with a *medium* heat obtained by

means of the vapour of boiling water, frequently stirring it until it acquire a consistence adapted to the formation of pills.

In this manner are prepared:

Extract of Wormwood Tops.	Extract of Logwood Raspings.
Hepatic Aloes.	The Strobiles of the
Chamomile Flowers.	Hop.
Broom Tops.	Oak Bark.
Gentian Root.	Rue Leaves.
Liquorice.	The Herb and Root of Dandelion.

REMARKS.—I presume the intention in classing these preparations, was to have separated them into three divisions, viz.: 1st. *Inspissated Juices*, obtained by evaporating to a proper consistence the juices expressed from fresh vegetables. 2d, *Simpler Extracts* obtained by evaporating the decoctions of certain plants; and 3d, *Resinous or Alcoholic Extracts*, in which spirit is the solvent used for the extraction of the soluble vegetable substances. But the distinctions have not been preserved; there are five preparations ordered as inspissated juices; and farther on we have an *Extractum Elaterii*, which, according to the rules laid down in the Pharmacopœia, is really neither an extract nor an inspissated juice, but if classed with either, ought to be amongst the latter, with which it more nearly coincides in the manner of its preparation; and such was the arrangement in the edition of 1807, where it is placed first amongst the inspissated juices, and called *Elaterium*, a name more happily chosen than the present one.

In the extracts also we have a section headed *Extracta Simpliciora*, which are ordered to be prepared by evaporating decoctions of the plants in water; but under this denomination are included all the spirituous and resinous extracts, which have no separate place, although

such a distinction was made in the former edition of the Pharmacopœia:

By the formation of vegetable extracts it is intended to present the active matter of the subject in a much smaller bulk, which to a certain extent is of course accomplished; but the operation by which this object is attempted to be attained, deteriorates materially many of the qualities of the substance operated on: whatever be the menstruum employed, the volatile parts are dissipated, and some of the fixed decomposed by the degree of heat required for the evaporation, particularly with the simpler or watery extracts; or the proper extractive is oxidized and consequently rendered inert.

To avoid this, the process is sometimes performed in vessels heated by steam, which is perhaps the most eligible mode of preparing extracts upon a large scale: evaporation at very low temperatures, in vessels exhausted of atmospheric air, and consequently under greatly diminished pressure, is occasionally resorted to; but the apparatus required for this purpose is too complicated for general use; that invented by Mr. Barry has been found to answer the intention better than any other: for a full account of his apparatus and mode of operating, see *Journal of Science and Arts*, vol. viii. p. 360.

Another method is to cause the rapid evaporation of the fluid from the extract, by placing it under the exhausted receiver of an air pump along with a vessel containing concentrated sulphuric acid, as in Leslie's method of freezing. In such an arrangement the evaporation is rapid even at natural temperatures, and very perfect extracts are produced.

Mr. Battley, of Fore-street, London, has invented a method of preparing narcotic extracts, which has been found to answer remarkably well; it is as follows: "the juice of the plants used, is passed through a fine hair

sieve, and immediately placed on the fire. Some time before it boils a quantity of green-coloured matter begins to float on the top: in the juice of some plants this matter is very abundant; it is to be carefully removed by means of a thin perforated tin dish. By the time the liquor boils, or soon afterwards, the green matter ceases to appear. The boiling is to be continued until rather more than half the fluid has been evaporated, when the decoction is to be put into a conical pan, where it is allowed to stand until cold. A large precipitation of dark green-coloured feculent matter will then be found to have taken place, from which the supernatant fluid is to be poured off, and again exposed to evaporation until half of it is consumed; when it is to stand for precipitation.

“ The precipitated matter from the second coction is by no means so green as the first. The remaining fluid is now to be suffered to boil till it acquire the consistence of syrup, when the matter which had been collected at the commencement by filtration and precipitation is to be mixed with it, and placed in a metallic pan in a water bath, and further evaporated till reduced to the consistence of an extract. In this latter part of the process the operator must take care to prevent the extract from sticking or becoming hard on the sides of the pan; for if it be allowed to harden, the extract loses its green colour, and in proportion to such loss, is the deterioration of its medicinal virtues.” See *London Medical Repository*, vol. iv. p. 198.

The knowledge which has been recently acquired on the preparation of extracts prohibits the subjection of bitter substances to a long decoction; for it has been shewn that by maceration and infusion the products are better, and even more abundant. This is the result of the experiments of MM. Baget, Blondeau, and Guibourt. See *Jour. de Pharm.* tom. ix. p. 283.

From repeated experiments on extracts, M. Orfila has established this kind of axiom, that the virtue of these preparations is in an inverse ratio of the temperature to which they have been subjected.

Alcohol is employed only with those substances whose active ingredient is chiefly resin, or too volatile to bear the heat which is necessary for evaporating water without being dissipated, or suffering some decomposition which would materially alter and impair its properties.

Water is used with those substances in which gum, extractive matter, tannin, cinchonine, sugar, fecula, &c. are the predominant constituents; and sometimes substances are operated on by both solvents successively where the constituents are of both kinds, as for instance, in the extract of jalap.

Distilled water ought to be used in the formation of extracts, since the residual ingredients of common water will remain with the product, and uselessly increase its bulk, or even in some instances cause chemical changes. Rain water carefully collected is also suitable for such a purpose.

EXTRACT OF WORMWOOD.

REMARKS.—Wormwood has a very strong, and to some persons an intolerable odour, from which it is freed by boiling, which dissipates its essential oil on which the odour depends. The older writers extol it as a vermifuge, and hence is derived its name.

According to Chereau and Robiquet, beer made with wormwood intoxicates more quickly, and its digestive properties are well known to gastronomes.

MEDICAL PROPERTIES AND USES.—It is a bitter tonic, and is sometimes serviceable in dyspepsia and

other complaints, for which bitters are usually given. It is now very little used. It is asserted that the milk of a woman, who took this extract, became extremely bitter.—*Act. Hafn.* vol. ii. p. 165.

For some years past the roots of the common worm-wood have been much used in Germany for the cure of epilepsy. They were first introduced to the notice of the profession by Hufeland, in his Journal for April 1824, on the authority of Dr. Burdach: the dose of the powdered root is, for an adult, from fifty to seventy grains. For a detailed account of the practice see *Duncan's Supplement*, pp. 30-31.

DOSE.—From ten grains to twenty three times a day.

EXTRACT OF HEPATIC ALOES.

REMARKS.—This extract is now introduced for the first time into this Pharmacopœia. In this preparation of aloes, the resin is in a great measure got rid of, on which account it is supposed to be more purgative and less apt to gripe or irritate. With respect to the relative proportion of the resinous and other constituents in the two species of aloes used in medicine, the greatest difference of opinion exists. To determine this, analyses have been made by M. Braconnot, M. Tromsdorff, and by MM. Bouillon Lagrange, and Vogel, and their experiments give totally different results.

According to Braconnot, aloes is not a *gum-resin*, as generally supposed, but approaches more in its character to gum than to resin: he proposed to name its principle *resino-amer*; he founds his opinion on the entire solubility of aloes in water as well as in alcohol, and the consequent impossibility of separating different

principles. Lagrange and Vogel, however, support the opinion of Tromsdorff, and have proved that aloes really contains two principles, the one extracto-resinous, the other purely resinous, dissolving completely in alcohol, but remaining for a long time unaltered in water. The result of their analysis of the two kinds of aloes is, that there exists in one hundred parts of

Socotorine Aloes.		Hepatic Aloes.	
Extractive	68	Extractive	52
Resin	32	Resin	42
		Insoluble Matter	6

And 2d, that socotorine aloes contains an agreeable volatile oil which does not exist in the hepatic.—*Dict. de Drogues Simp. et Comp.* vol. i. p. 271.

Lewis thus states the relative produce of gum and resin, from twelve ounces of each of the three kinds of aloes :

Caballine.		Hepatic.	Socotorine.
Resin	2 ounces	Resin nearly 4 ounces	Resin 3 ounces
Gummy Extract	9 ounces.	— 8 ounces	Less than 9

Mat. Med. vol. i. pp. 75-6.

The extractive of aloes has been examined by Pfaff, and by him named *Aloesin* ; when dry it has a red brown colour, is translucent in thin fragments, has a very bitter taste and a weak smell, something like saffron. In powder it has a beautiful yellow colour ; it is perfectly soluble in water and in alcohol, and is insoluble in ether. Meissner, of Halle, has announced his discovery of an alkaloid in aloes.

In the former edition of this Pharmacopœia the *Aloe sinuata* was named as the source of the hepatic aloes, but it is now referred to the *Aloes vulgaris* of De Candolle.

The best hepatic aloes is brought from Barbadoes in large gourd shells; an inferior sort, which is soft and clammy, is brought over in casks. See *Duncan's Supplement*, pp. 12-13, for some very interesting information on the subject of aloes.

MEDICAL PROPERTIES AND USES.—It is carthartic and apt to irritate the rectum, and therefore should not be given when there is a disposition to hæmorrhoids or in dysentery: and from its liability to disturb the uterine system by sympathy, it should be avoided in pregnancy, particularly when there is any tendency to abortion. Aloes is a very eligible purgative in jaundice, as best calculated to supply the place of the obstructed bile, which it nearly resembles in some of its qualities; for this purpose, the extract being deprived of its resin, is inferior to the common substance. Its nauseous taste may be best concealed by extract of liquorice.

DOSE.—Five grains to a scruple, in pills.

EXTRACT OF CHAMOMILE FLOWERS.

REMARKS.—This is the *Extractum Anthemidis* of the London and Edinburgh Colleges. One hundred weight of the flowers yield about forty-eight pounds of extract, which does not retain the peculiar odour of the chamomile, the volatile oil on which that depends being dissipated during the boiling, which loss however may be prevented by preparing the extract *in vacuo*, by which means all the odour and taste of the recent flower may be preserved.

MEDICAL PROPERTIES AND USES.—It is a bitter tonic and stomachic; its efficacy is so inconsiderable, that it is hardly ever used alone, but is considered an

useful adjunct to other tonic substances in stomachic pills.

Dose.—Ten grains to a scruple.

EXTRACT OF BROOM TOPS.

REMARKS.—In the former edition of this Pharmacopœia this was called *Extractum Cacuminum Genistæ*; but the proper systematic name is now introduced.

MEDICAL PROPERTIES AND USES.—It is diuretic and laxative. Broom tops were formerly much relied on as a remedy in dropsy, in which Mead and Cullen found them useful. The former mentions a very remarkable cure of a case accomplished by a decoction of them, after paracentesis had been thrice performed, and various other means adopted without benefit. Sydenham used the ashes in this disorder, and Monro speaks highly of their efficacy, which however must be attributed to the fixed alkaline salt which they contain. This remedy is at present seldom employed.

Dose.—From half a drachm to a drachm.

EXTRACT OF GENTIAN ROOT.

REMARKS.—This preparation contains the bitter principle of the gentian, which is soluble in water: see also *Tinct. Gentian*: the extract is powerfully bitter, and according to Mr. Brande, is afforded in the average proportion of half the weight of the root employed.

Guibourt and Cadet de Vaux prepared this extract by infusion, and obtained both a larger quantity of extract, and of a quality in every respect superior to that

prepared by decoction ; this mode of making the preparation is ordered by the Parisian Codex.—See *Remarks*, p. 491.

MEDICAL PROPERTIES AND USES.—It is used as a bitter tonic and stomachic, in dyspepsia, jaundice, dropsy, and in all cases of general debility in which tonics are indicated. It is also an appropriate vehicle for the exhibition of the metallic oxides. I have found a combination of the sulphate of quinine with this extract, in the form of pills, a very valuable tonic medicine, and possessing the advantage of keeping the bowels gently open at the same time.

The use of gentian as an agent in medicine is of very ancient date, as the plant is said to have been named after Gentius, King of Illyria, who first discovered its medicinal properties 167 years, B. C.

DOSE.—Ten grains to half a drachm, twice or thrice a day.

EXTRACT OF LIQUORICE.

REMARKS.—This extract is hardly ever prepared by the apothecary in this country. It is imported in a coarse form from Catalonia, in Spain, in cylindrical rolls covered with bay leaves. This impure extract is dissolved in water, the solution is then filtered and inspissated in the usual manner, and the product is the pure extract of liquorice, known by the name of *Refined Liquorice*. Amongst other impurities thus got rid of, are small scales of copper, which, according to Virey, are often found in so large a proportion as two drachms in a pound: they are scraped by the iron spatulas from the sides of the copper pans used in preparing the extract, and thus become incorporated with it.

According to Chevallier, the extract brought from

Calabria appears to be prepared with more care than the Spanish. It is less frequently adulterated, is sweeter, and more soluble in water. It is obtained from the roots of the *Glycyrrhiza Echinata*.—*Dict. de Drogues, Simp. and Comp.* vol. iv. p. 392.

The Parisian codex orders this extract to be prepared by infusion. The refined liquorice sold in the shops in small cylindrical pieces about as thick as a crow-quill, is made by evaporating a solution of the pure extract with half its weight of gum arabic; the mass is rolled out, cut into lengths, and the pieces polished by rolling them together in a box. *Glue* is often fraudulently introduced into the composition of this article.

According to Mr. Brande, liquorice root affords about one-fourth of its weight of extract. This does not agree with the results obtained by Recluz, see Table at the end of this section; and Lewis says, that the extract "amounts to near half the weight of the root." Neumann got from 480 parts of Spanish extract 460 parts of watery extract, and the residuum was not affected by alcohol. The sweetness of the root depends upon a peculiar incrySTALLIZABLE principle discovered by Robiquet, and called by him *Glycyrrhizin*; its taste is intensely sweet, it is sparingly soluble in cold water, but readily in hot, and also in alcohol, even without heat; and it is incapable of the vinous fermentation. The extract of liquorice should dissolve in water without leaving any feculence.

MEDICAL PROPERTIES AND USES.—It is an useful addition to some of the nauseous purgatives, particularly the aloetic, the disagreeable flavour of which it conceals better than any other adjunct. It is easily softened by warmth, on which account pills made with it are apt to lose their round form. As a demulcent it is very useful in allaying the tickling cough of catarrh.

DOSE.—One or two drachms.

EXTRACT OF LOGWOOD.

REMARKS.—For the preparation of this extract the raspings of the logwood are ordered to be used; one hundred weight of which, according to Mr. Brande, yields about twenty pounds of extract, which becomes extremely brittle when kept.

According to the analysis of Chevreul, the colouring principle of this wood depends on a peculiar crystallizable matter, which he called *Hæmatine*; this seems an objectionable term, as from its great similarity in sound to Emetine, it is likely to lead into dangerous mistakes. *Hæmatoxyline* would have been a preferable term. *Hæmatine* is of a reddish white colour, is but sparingly soluble in water, has a bitter astringent taste, and precipitates gelatine in red flakes.

MEDICAL PROPERTIES AND USES.—It is used as an astringent in diarrhœa and the latter stage of dysentery; in which disorders it may be of use by giving tone to, and correcting the lax state of the intestines.

It sometimes imparts a bloody hue to the urine, and gives a purplish red colour to the stools, which circumstance has been taken advantage of to impose on hypochondriacs and credulous persons. It becomes so exceedingly hard when kept, that pills made of it often pass through the body without undergoing any change.

DOSE.—Ten grains to half a drachm, in pills or dissolved in cinnamon water.

EXTRACT OF HOPS.

REMARKS.—This extract is now introduced for the first time into this Pharmacopœia; and the strobiles are

the part of the plant ordered to be used in the preparation. These strobiles are the flowers of the *female* plant, and contain the *lupuline* on which the efficacy of the extract depends; for an extract prepared with hops from which all the *lupuline* has been previously separated, possesses none of the virtues of the hop plant.

From the investigations of MM. Payen and Chevalier, it appears that *lupuline* constitutes the tenth part of hops of good quality, and that consequently it might be substituted in such proportion for hops in the different preparations of that plant: so that, for instance, the tincture of hops in this Pharmacopœia, might be made with half an ounce of lupuline, instead of the five ounces of hops, as ordered.

This extract is inodorous, the aroma which resides in a volatile oil being dissipated by the boiling, but it retains the bitter taste peculiar to the hop. The average produce of extract is, according to Mr. Brande, about 40 lbs. from one hundred weight of hops. The quantity of water here ordered is too small.

MEDICAL PROPERTIES AND USES.—It is used as a narcotic, tonic, and diuretic. Dr. A. T. Thomson informs us, that he has found a combination of this extract with the subnitrate of bismuth, prove almost uniformly successful in those cases of pyrosis and other varieties of dyspepsia, which were the result of mere atony of the digestive organs without organic mischief. Dr. Maton says, he found it very efficacious in allaying the pain of articular rheumatism; but general experience throws great doubt on its medical efficacy.

Lupuline is a good deal used on the continent in the several forms of powder, tincture, syrup, &c.

Frank recommends an ointment of it in the last stage of cancer, when the pain is very severe, and other remedies have failed: the following is the formula for its preparation, by M. Planche: take of lupuline, bruised,

one part, fresh lard three parts; heat them by a water bath, in a close vessel, for six hours; strain; allow it to cool; scrape off the sediment, and melt again. The ointment so prepared is of a fine yellow colour, and retains the smell of the lupuline.

It has long been a popular belief that a pillow of hops, used in the delirium of fever or in mania, will procure sleep. Dr. A. T. Thomson mentions this effect as having been confirmed in the case of the late King, George the Third; and Dr. Duncan speaks of it as a fact confirmed by later experiments.

A case has just come to my own knowledge, in which the use of a hop pillow was attended with the most beneficial effects. A lady of my acquaintance, after hearing some sudden news which distressed her much, was seized with fever, and during its continuance she remained for nearly four weeks perfectly sleepless and delirious; after every means had been tried in vain to procure sleep for her, her physician proposed the trial of the hop pillow, and the consequence was, an undisturbed sleep of fourteen hours, from which she awoke not only refreshed, but free from delirium, and from that time her convalescence was progressive.

DOSE.—Five grains to one drachm.

EXTRACT OF OAK BARK.

REMARKS.—The astringent property of oak bark depends upon the presence of *tannin*, which exists in it in considerable quantity. Sir H. Davy found that an ounce of the inner cortical part of young oak bark, afforded by lixiviation 111 grains of solid matter, of which 77 were *tannin*; and the cellular integument, or

middle coloured part, yielded only 43 grains of solid matter, of which 19 were *tannin*, and the epidermis furnished scarcely any tannin or extractive; hence, the bark of the smaller branches, where the epidermis is still thin, ought to be preferred, and should moreover be cut in spring, at which time, according to Beguin, Phil. Trans. 1799, it contains four times more of the astringent principle than that which is taken in winter. Dr. Duncan says, that this “extract is sometimes so prepared as to be sold for *Kino*.”

The species ordered in this Pharmacopœia is the *Quercus Robur*, of which the *Quercus Pedunculata* of the London College is, according to Richard, merely a variety, and not a different species, as supposed by some.

MEDICAL PROPERTIES AND USES.—It is used as an astringent to restrain hæmorrhages and preternatural or immoderate secretions. It has been found serviceable in the cure of intermittents.—See *Decoction of Oak Bark*.

DOSE.—Ten grains to one drachm.

EXTRACT OF RUE.

REMARKS.—This extract retains neither the odour nor stimulant powers of the plant, as these depend on its volatile oil, which in this preparation is dissipated by the boiling and subsequent evaporation.

“Rue was used as a condiment by the ancients, whose taste must have differed considerably from ours; with them assafoetida was quite a regale, though so little relished in these days: even at present, the peasantry in the south of Italy and in Spain do not dislike those powerful odours, and that of rue, which they consider as antiseptic, is agreeable to them.”—*Richard. Dict. de Drogues Simp. et Comp.* vol. iv. p. 457.

MEDICAL PROPERTIES AND USES.—As a bitter tonic, for which purpose it is inferior to the extracts of chamomile, gentian, &c. It has been given in amenorrhœa with very little advantage, if any.

DOSE.—Ten grains to twenty.

EXTRACT OF DANDELION.

REMARKS.—The London College order the root only to be employed, as possessing more of the medicinal power than any other part of the plant. The plant should be used fresh, as its bitterness is destroyed by drying; and Lewis says, that the extract also loses much of its efficacy by keeping.

An infusion of the roasted roots is substituted for coffee by the poorer inhabitants at Göttingen, who find that an infusion prepared in this way can hardly be distinguished from that of the coffee berry.

Water extracts its virtues better than spirit; according to Cartheuser, the watery extract amounts to one-fourth, the spirituous only to one-eighth the weight of the root. Mr. Brande states the produce of extract to be from 20 to 25 lbs. from one hundred weight.

MEDICAL PROPERTIES AND USES.—As an aperient, deobstruent, and diuretic. Dandelion has long been a popular remedy in hepatic derangements and visceral diseases, and several eminent physicians, both in this country and on the continent, particularly in Germany, have recently borne testimony to its efficacy in such disorders; Boerhaave, and several of the older physicians, entertained a high opinion of its deobstruent powers. At present it is given in jaundice, dropsy, and dyspepsia; in the latter it is particularly recommended by Dr. W. Phillip, who considers it “best adapted to these cases in

which the bile is deficient or much disordered, while the power of the stomach is still considerable.”

Dr. Pemberton affirms, that he has seen great advantage result from the use of this extract, given in half drachm doses; in chronic inflammation and incipient scirrhus of the liver, and in chronic derangement of the stomach.

DOSE.—Ten grains to half a drachm, in combination with sulphate of potash.

EXTRACT OF CINCHONA BARK.

Take of the Pale Bark, coarsely powdered, a pound,
Water, six pints.

Boil, for a quarter of an hour, in a vessel almost covered; then having filtered the liquor while yet hot, and laid it aside, boil the bark again in an equal quantity of water, and filter again in the same manner; proceed in the same way a third time, and then mixing all the liquors, reduce them by evaporation to a proper consistence.

This extract should be kept in two states; *soft*, for the formation of pills; and *hard*, that it may be reducible into powder.

REMARKS.—The bark is ordered to be only *coarsely* powdered, because it is one of those substances to which the impalpable form appears to be extremely injurious; in consequence probably of an essential part of their composition being dissipated, or chemically changed by the operation; and, in fact, Fabbroni found that cinchona yielded a much larger proportion of soluble extractive when only coarsely powdered.—See *Remarks on Powders*.

The decoction is ordered to be made in a closed ves-

sel, and the time of boiling limited, to prevent as far as may be, the injurious effects of too long exposure to heat and air.

And the decoctions are ordered to be filtered while hot, because on cooling they become turbid, and deposit a sediment containing some of the active principle of the bark, which would be thus lost.

The existence of a peculiar vegetable principle in the *Pale bark*, on which its activity depends, was first discovered by Dr. Andrew Duncan, jun. of Edinburgh, in 1803, and named by him *Cinchonin*. The subject was afterwards more fully investigated by MM. Pelletier and Caventou in 1818. This substance appears to concentrate in itself the febrifuge and other powers of the bark, and agrees in its medical properties and applications with quinine, which see. It exists in the bark united to *kinic acid*.

The extract here directed contains the active principle of the bark in the form of a *kinate of cinchonin*, which is taken up by the boiling water during the decoction; but its properties are much impaired by the oxydizement of the extractive matter which takes place to such an extent during the long exposure of the solutions to heat and air, that not more than one-half of the preparation is soluble in water; nor can the extract be equal in efficacy to the quantity of bark from which it is procured. Cadet de Vaux obtained by infusion a larger quantity of extract and of a finer quality than that prepared by decoction; such an extract however would probably possess less activity. Mr. Brande says, that this preparation "should always be evaporated to that brittle state in which it may be powdered."

The quantity of watery extract yielded by the bark is differently stated: Mr. Brande in his *Manual of Pharmacy*, page 60, *note*, says that 50 lbs. of bark yield 20 pounds of aqueous extract; and at page 391, he states

the average produce from one hundred weight to be 38 pounds. According to Dr. Paris, 14 ounces of bark afford $3\frac{1}{2}$ ounces of watery extract.

Recluz states the produce of extract from a pound of this bark, to be from 4 ounces to $5\frac{1}{2}$.

Barry's extract of bark, which is of a particularly fine quality, is thus prepared: a tincture of bark made with rectified spirit, is distilled until the whole of the spirit is driven off; the remaining solution is then left to cool, after which the resin that floats on the surface is removed, and the residuum inspissated at a low temperature.

A preparation sold under the name of *Essential Salt of Bark*, is merely an extract prepared by macerating the bruised substance of bark in cold water, and submitting the infusion to a very slow evaporation.

MEDICAL PROPERTIES AND USES.—It is used as a tonic, stomachic, and febrifuge, in the cure of intermittents and acute rheumatism, after evacuating the bowels: in passive hæmorrhages and diseases attended with, or arising from debility or deficient action; but, for the reasons assigned above, the properties of the bark in this preparation are much invalidated, and in the opinion of some, the extract is less efficacious than the simple powder, even in equal quantities. It however often agrees with the stomach when the powder is rejected, and its taste, though very bitter, is less austere.

Lewis says, that of several substances which he tried, he found liquorice conceal the unpleasant flavour of bark better than any other adjunct.—*Mat. Med.* p. 140. The general introduction of sulphate of quinine into practice has latterly caused this, and other preparations of bark for internal use, to be much less frequently employed.

DOSE.—Ten grains to half a drachm.

SIMPLE EXTRACT OF COLOCYNTH.

Take of the pulp of Colocynth, a pound,
Water, a gallon.

Boil down to four pints, and filter the liquor while hot; then evaporate to a proper consistence.

REMARKS.—This extract is now for the first time introduced into this Pharmacopœia. The Parisian codex orders it to be made by infusion and maceration in cold water, by which mode of operating the extract is free from the resinous constituent of the pulp.

The decoction is ordered to be filtered while hot, because on cooling it gelatinizes, and will not pass through the filter. It is very difficult to boil the pulp in the quantity of water ordered.

Colocynth pulp consists chiefly of mucilage, resin, the bitter principle, and some gallic acid; and from the experiments of M. Vauquelin, it appears that the active principle resides in a peculiar yellow substance, which he called *Colocyntine*. It is soluble in alcohol, but only partially so in water. Hence the watery extract, which does not contain the resinous portion of the pulp, with which a considerable quantity of the *Colocyntine* is united, and into which that principle enters but sparingly, is freed from the dangerous activity of the unprepared pulp, which, given alone, even in moderate doses, often produces very violent effects.

Thunberg informs us, that this article is rendered so perfectly mild at the Cape of Good Hope by being pickled, that it is absolutely used as food, both by the natives and colonists.

According to Mr. Brande, nearly five-sevenths of the pulp of colocynth is soluble in water. Lewis states the quantity at more than half. Neumann got from 7680

parts 1680 of alcoholic extract, and then 2160 of watery; and inversely, 3600 watery, and 224 alcoholic. The product obtained at Apothecaries' Hall is 65 per cent.

This extract has the disadvantage of becoming very tough by keeping, so that it is very difficult either to form it into pills or reduce it to powder.

MEDICAL PROPERTIES AND USES.—It is much used as a cathartic, and is best given in combination with calomel or blue pill, in which form it is generally prescribed, and may be given in cases where the compound extract would be inadmissible, on account of the stimulating nature of some of its ingredients.

DOSE.—Five grains to twenty.

COMPOUND EXTRACT OF COLOCYNTH.

Take of the Pulp of Colocynth, cut very small, six ounces,

Hepatic Aloes, twelve ounces,

Scammony, powdered, four ounces,

Cardamom Seeds, powdered, an ounce,

Hard Soap, three ounces,

Proof Spirit, a gallon.

Macerate the pulp of the colocynth in the spirit, with a medium heat, for four days. Having expressed and filtered the liquor, add to it the Aloes, Scammony, and Soap; then evaporate the mixture until it acquires a consistence adapted to the formation of pills, and towards the end of the process mix in the Cardamom seeds.

REMARKS.—In the former edition of this Pharmacopœia, water was directed as the menstruum in this preparation; proof spirit is now employed, as being a more

efficient solvent of the constituents of the colocynth pulp, which contains a considerable quantity of resin. The addition of the cardamom seeds is delayed, till towards the end of the process, in order to avoid the dissipation of their essential oil during the evaporation, by which their properties would be much impaired.

MEDICAL PROPERTIES AND USES.—As a cathartic and stimulant, it is used with advantage to obviate habitual costiveness in cold habits; and in combination with calomel, which is not decomposed by the soap, it forms one of the most valuable medicines we possess, for removing visceral obstructions, and stimulating the uterine system in cases of amenorrhœa. I have myself found such a combination act most beneficially in the removal of intestinal worms; in one case, in particular, lately under my care, it caused the expulsion of a tape worm ten feet and a half long, which was passed unbroken and *alive*, in which state it continued for some hours.

The operation of this extract is rendered much more mild, and no less efficacious, by the addition of the extract of hyoscyamus. See *Inspissated Juice of Henbane*, p. 487.

Mr. Brande remarks, that “the greatest difference will be found in the activity of this extract, obtained from different sources; half a drachm of one sample being sometimes less purgative than ten grains of another. This arises either from carelessness in its preparation, as when it is burned; or inattention to the goodness of its ingredients; or not unfrequently to fraudulent substitution of some of its components. It is said that the *seeds* of colocynth are sometimes substituted for an equal weight of pulp; in which case the extract must be much less active, as the seeds, though their extract is purgative, yield very little of it.”—*Manual*, p. 68.

DOSE.—Five grains to twenty.

EXTRACT OF ELATERIUM.

Slice the ripe fruit of the wild cucumber into a vessel, placed underneath; and having very gently expressed the juice, pass it through a very fine hair sieve into a glass vessel; then set it apart for some hours, until the thicker part subsides; reject the supernatant liquor, and having received the fecula upon a linen cloth, and covered them with another, dry them with a medium heat.

REMARKS.—In the former edition of the Pharmacopœia, this preparation was called ELATERIUM, and although now called an extract, it certainly does not properly deserve the name, being neither an extract nor an inspissated juice, but a peculiar modification of fecula, combined with a very active principle, which is deposited with it.

Pepo, in vegetable physiology, is adopted as a technical term by Gærtner and Willdenow, for a particular kind of succulent fruit exemplified in the Elaterium, and others of the natural order, *Cucurbitaceæ*. Willdenow has described it as a distinct kind of fruit ranging after the *pomum* or apple, with which Linnæus has confounded it in his generic descriptions of *Tricosanthes*, *Momordica*, *Cucurbita* and *Cucumis*.

From the experiments of Dr. Clutterbuck, it is proved that this principle is contained, *almost exclusively*, in the juice around the seeds, and that the substance which spontaneously subsides from this juice, obtained *without pressure*, is *genuine* elaterium; the quantity of which contained in the fruit is extremely small, for he obtained only *six* grains from *forty* cucumbers.

Dr. Paris, who subsequently performed a series of experiments on the subject, named this principle *Elatin*; which, according to him, exists in the common elaterium

of the shops, only in the proportion of one grain in ten, and is insoluble in water, soluble in alcohol; forming a beautiful green solution from which it is precipitated by water; it is soluble in alkalies, and purges in very minute quantities. "It appears," says he, "that the whole of the elatin does not separate itself from its native juice by spontaneous subsidence, and that, on this account, the supernatant liquor possesses some power as a cathartic. We cannot be surprised, therefore, that the elaterium of commerce should be a very variable and uncertain medicine; for, independent of the great temptation which its high price holds out for adulterating it, which is frequently done with starch, it necessarily follows, that where the active principle of a compound bears so small a proportion to its bulk, it is liable to be affected by the slightest variation in the process for its preparation, and even by the temperature of the season; where pressure is used for obtaining the juices, a greater or less quantity of the inactive parts of the cucumber will be mixed with the *Elatin*, in proportion to the extent of such pressure, and the *Elaterium* will, of course, be proportionally weak."

THE ADULTERATION OF ELATERIUM WITH STARCH may be detected by adding to a solution of it some of a solution of iodine, which, if starch be present, will produce a blue colour.

This fraud is expressly mentioned by Dioscorides: ἐνιοὶ δὲ καὶ τῷ χυλῷ τοῦ σικκούου μὴ γνύουσιν ἄμυλον πρὸς τὸ μίμησασθαι αὐτὸ λευκὸν καὶ χοῦφον.—Liber. iv. cap. 155. The same author also mentions, that the extract of elaterium retains its cathartic powers for ten years.

Good elaterium should be light, pulverulent, and inflammable, of a greenish-grey colour and a bitter taste. The inferior quality is of a dark green colour, approaching to black, is compact and very heavy, and breaks with a shining resinous fracture.

The Edinburgh College have, in the last edition of their Pharmacopœia, transferred *Elaterium* from among the preparations to the list of simples, because, as Dr. Duncan informs us, in Scotland it is never prepared by the apothecary.

It is said that in Holland an extract, made with wine from the roots of the plant, is substituted for the elaterium, and is found equally efficacious and safe.—*Lewis*, vol. i. p. 328.

Mr. Brande mentions, that “ the persons who cut and press these cucumbers, generally suffer extremely from inflammation and ulceration of the fingers, and parts touched by the juice.”

MEDICAL PROPERTIES AND USES.—It is a powerful cathartic of that kind which are named hydragogues, and as such it has been much recommended in dropsy by Sydenham, Hoffman, and others, and more recently by Dr. Ferriar, of Manchester, who used it with great success in hydrothorax. In ascites it is reported to have caused the entire evacuation of the fluid, after the failure of the most active remedies: but from the uncertainty in its strength, and the very violent effects which it sometimes produces, it is a very objectionable remedy, and should never be given as a mere purgative in cases of obstinate constipation. Its use gives rise to a degree of fever for the time, and so remarkably raises the pulse, that, according to Lister and Hoffman, its effect is perceptible even in the extremities of the fingers.

DOSE.—Half a grain to a grain.

EXTRACT OF JALAP.

Take of Jalap Root, powdered, a pound,
Rectified Spirit, four pints,
Water, a gallon.

Macerate the jalap root in the spirit for four days, and pour off the spirit. Boil the residuum in the water until it is reduced to two pints; then filter the tincture and the decoction separately, evaporate the latter, and distil the former until each of them begins to grow thick. Lastly, mix the extract with the resin, and by means of the heat of boiling water reduce them to a proper consistence.

REMARKS.—The quantity of water ordered in the former edition of this Pharmacopœia was ten pints; the quantity now directed is sufficient as a menstruum, and requires less evaporation; by which so long an exposure of the extract to heat and air, and its consequent oxidizement, is also avoided.

It ought to have been directed to be kept in a hard, as well as in a soft state, as it is afterwards so ordered as an ingredient in the Compound powder of scammony.

According to the analysis of Cadet de Gassicourt, resin and gummy extract constitute two of the principal ingredients in jalap root, and their combination seems necessary to produce the full cathartic effect of the remedy. The extract obtained by water from the residuum, after the separation of the resin by alcohol, is said to be inert as a purgative, but to possess diuretic properties; however this may be, the combination of the two extracts affords an agent much to be preferred to the resinous extract alone, which is very apt to cause severe gripings and tormina in the bowels; whereas by combining both, the gummy matter divides the resin and prevents its too violent irritation.

Lewis observes, that “the proportion of active matter differs greatly in different parcels of jalap; sixteen ounces of some sorts yielding hardly two of resin, while the same quantity of others affords three or four. Hence the extracts of jalap appear preferable to the root in

substance, not only on account of the dose being rendered smaller by the rejection of the woody parts, but likewise as being more uniform and certain in strength."

Mat. Med. vol. i. p. 422.

It appears to me, that in order to make the latter part of this observation correct, or available in practice, we should know the proportion of active or resinous matter contained in the extract, as this is, according to Lewis's own statement, so very variable that hardly any two extracts can contain it, in equal relative quantity; and so must of course be liable to the same degree of uncertainty, objected to the root itself, which I believe is found to be the case.

"Jalap root is liable to be preyed on by insects, which destroy only the amylaceous part and do not touch the resin, so that in that state the jalap possesses more activity, and is, therefore, sought after by some pharmacutists; but it is to be doubted whether the powder of jalap so altered retains its energy of action." *Guillemin, Dict. de Drogues, Simp. et Comp.* vol. iii. p. 281.

Dr. Woodville, in his Medical Botany, asserts, that "the gummy part bears an inconsiderable proportion to the resinous;" but it appears from the experiments of Gassicourt, that in 500 parts of jalap the gummy extract constituted 220 parts, the resinous only 50. Richard agrees with Gassicourt, but Virey says the resin makes one-third of the whole root; this seems overrated. Mr. Brande states it to be 15 lbs. in one hundred weight.

Mr. Hume, jun. has announced the existence in jalap of a peculiar saline principle, which he obtained by treating jalap with acetic acid, and named *Jalapine*, it exists in the jalap root in the proportion of five grains in the ounce.

In the former edition of this Pharmacopœia, a simple watery extract of jalap was ordered, which is now

omitted: such an extract consists chiefly of the gummy part of the jalap, very little of the resin being taken up by the water. It is milder in its operation than the root, and suited to young children, triturated with sugar; cream of tartar, or testaceous powders.

The pure resinous portion is ordered in the Parisian Codex and other foreign Pharmacopœiæ.

According to Mr. Brande, one hundred weight of jalap affords about 50 lbs. of watery extract, and 15 of resin.

MEDICAL PROPERTIES AND USES.—It is used as a hydragogue cathartic, but appears to possess very little if any superiority over the simple powder of the root, except that its dose is somewhat smaller. It is best given in combination with soap or calomel, with a drop or two of essential oil to prevent its griping, which it is apt to do when given alone.

DOSE.—Ten grains to one scruple.

WATERY EXTRACT OF OPIUM.

Take of Opium, sliced, two ounces,
Boiling Water, a pint.

Triturate the opium with the water for ten minutes, and after a short interval pour off the liquor: triturate the residual opium with an equal quantity of boiling water, and for the same length of time, pouring off the liquor as before; do this a third time; mix the liquors, and expose the mixture to the air for two days in an open vessel. Lastly, filter through linen, and reduce it to an extract with a slow evaporation.

REMARKS.—In this preparation of opium a certain proportion of all its ingredients are taken up, but much

less of the resinous than of the gum or extractive part, and a very small proportion of the *narcotine*, which MM. Robiquet and Majendie, by experiments on living animals, seem to have satisfactorily proved to be the exciting principle of the opium, though denied by M. Orfila.

The whole of the narcotine may be got rid of by the process recommended by M. Robiquet, which consists in agitating the extract as soon as it acquires the consistence of syrup, with ether; and repeating this agitation with fresh portions of ether, as long as the ether on distillation deposits any crystals of narcotine; M. Dublanc, jun. has proposed as an improvement in this process, to use warm ether, by which, he says, the narcotine is more completely taken up. The extract so prepared contains only morphia, gum, and extractive, and is said to be greatly superior in its effects to the common extract.

The London College directs this extract to be prepared with cold water, by which mode of operating a considerable quantity of the active matter of the opium is lost; for Mr. Phillips found that of 72 parts of opium, treated as directed by the London College with cold water, 30 parts only were taken up, and that by boiling in water, nine additional parts were dissolved, so that the product obtained by using boiling water is, to that obtained when cold water is applied, very nearly as four to three. If the above be correct Mr. Brande must be mistaken in his observation on the London process, when he says that between 70 and 80 lbs. of extract are generally obtained from 112 lbs. of opium.

According to Dr. A. T. Thompson, "when carefully triturated with hot water, about five parts in twelve of the opium are dissolved and retained in solution nearly six parts are simply suspended, and rather more than one part remains perfectly insoluble, of a viscid plastic

nature, somewhat resembling the gluten of wheat, but of a dark colour."

The quantity of extract obtained by the process here ordered will evidently be greater than that obtained according to the directions of the London College, and will also contain more of the active principle, which, whether meconiate, as maintained by Sertuerner and Robiquet, or codiate as announced more recently by M. Robinet, is more soluble in hot than in cold water. I am informed that the quantity of product obtained at the Apothecaries Hall, operating according to the directions given in this Pharmacopœia, amounts to 61 per cent. of extract of pilular consistence.

Mr. Phillips remarks, that the solvent action of water with respect to opium, seems considerably increased by vegetable acids, without interfering with or diminishing its narcotic power; and there can be little doubt that by the addition of a vegetable acid, as for instance vinegar, to the water, the strength of the extract would be considerably increased, as the menstruum would then dissolve much more readily, and in greater quantity, the morphine, of which no inconsiderable quantity remains behind in the dregs.

MEDICAL PROPERTIES AND USES.—It is used as an anodyne, sedative, and antispasmodic, and is generally considered to produce its effect with less subsequent disturbance of the system than crude opium, as it contains but little of the exciting principle, and is freed from the greater part of the resin, woody fibre, and other impurities with which the opium of commerce abounds, even to the one-fourth of its weight, according to Virey.

This extract is well adapted to irritable habits, and is to be preferred to fluid preparations of opium, where it is intended to continue the operation of the medicine, and not to obtain its full effects at once, as in diabetes;

but in cases of accident, or where the effects of opium are to be called into immediate action, the tincture or vinegar should be employed.

The extract prepared from the capsules of the white poppy has been recommended as producing the sedative effects of opium without its inconveniences, but it must be given in double the usual dose of opium.

Dose.—Half a grain to five grains.

EXTRACT OF RHUBARB.

Take of the Root of Rhubarb, powdered, a pound.

Proof Spirit, a pint.

Water, seven pints.

Digest for four days; then filter and set it aside that the dregs may subside. Pour off the liquor, and evaporate it to a proper consistence.

REMARKS.—This extract is now, for the first time, introduced into this Pharmacopœia. According to Dr. Duncan, rhubarb yields nearly the same quantity of extract to infusion and to decoction; but the former he thinks infinitely preferable, as being finer, more soluble in water, less mucilaginous, and more active. By decoction the starch is dissolved, and forms with the tannin a compound insoluble when cold, and an equal quantity of the active principle is combined with the woody fibre, and is not dissolved. The Parisian codex directs this extract to be made with cold water only.

The composition of rhubarb is by no means agreed on. Scheele ascertained that oxalate of lime was a very principal ingredient in it, and attributed to its presence the grittiness which good rhubarb has under the teeth, particularly that from China and Tartary; and M. Henry

confirms his opinion, and makes that salt amount to 29.98 parts in 100 of the root, while its existence is denied by Mr. Brande, who could not find it in any specimen which he examined.

Guillemin says, that this salt is invariably found in the foreign rhubarbs, and that its presence may serve as a distinguishing mark between them and the rhubarbs obtained in Europe by culture, which are either altogether without this salt, or contain it in an extremely small proportion; but the latter contains a much greater quantity of tannin, and are, consequently, more astringent.—*Dict. de Drogues, Simp. et Comp.* tom. iv. p. 425.

It is, however agreed that gum, resin, and extractive, enter into its composition; and hence, spirit and water are its most appropriate menstrua. The active principle of rhubarb has been lately made a matter of investigation.

M. Nani, an Italian apothecary, announced that rhubarb contains a new crystallizable vegetable alkali, of which he formed a sulphate. M. Caventou ascertained, that this pretended sulphate contains heterogeneous matters, and among others sulphate of lime. A formula for the preparation of this sulphate is given in the *Annals of Philosophy*, April 1826, by Mr. Carpenter. He has found, moreover, in the alcoholic extract of rhubarb, and by the aid either of ether or alcohol, a fatty matter containing a little odorous volatile oil, and a yellow colouring principle susceptible of crystallization, and of subliming by heat without decomposition. It is to this principle that the name of *Rhabarbarine* ought to be given.—See *Duncan's Supplement*, p. 87.

Rhabarbarine is yellow, insoluble in cold water, soluble in hot water, alcohol, and ether; it has a harsh and bitter taste. It forms with almost all the acids insoluble compounds of a yellow colour.

According to Mr. Brande, about 20 per cent. of inert matter is got rid of in the preparation of this extract; but its activity is not proportionably increased, the virtues of the root being decidedly impaired during the inspissation. The quantities of extract yielded by different species of rhubarb differ considerably:

Watery extract from 50 parts			Spirituos Extract.		
Chinese Rhubarb	-	22	Chinese	-	8
Muscovy	-	15.45	Muscovy	-	8.50
French	-	16.857	French	-	9.70

The product of extract obtained at Apothecaries' Hall, operating according to the formula of this Pharmacopœia, amounts to 47 per cent.

The spirituous extract dissolves almost wholly in water; and hence the tincture does not turn milky on being mixed with aqueous liquors; of the watery extract scarce above one-fourth is dissolved by rectified spirit, and the part which does not dissolve proves more purgative than that which does.—*Lewis*.

MEDICAL PROPERTIES AND USES.—The same as those of the root in powder, over which it possesses no advantage, except that it may be dissolved in aromatic waters.

The sulphate of rhabarbarine, which is a concentrated form of the active principle, separated from the ligneous and mucous portions, is said to bear the same relation to the crude substance that quinine does to Peruvian bark. Being a preparation of uniform strength, its dose can be apportioned with greater accuracy than that of common rhubarb, and it may be given, it is said, with safety to new-born infants.—*Silliman's Journal*.

DOSE.—Ten grains to half a drachm.

EXTRACT OF SARSAPARILLA.

Take of the Root of Sarsaparilla, sliced, a pound,
Boiling Water, a gallon.

Macerate for twenty-four hours ; then boil down to four pints, strain the liquor while yet warm ; and lastly, reduce it by heat to a proper consistence.

REMARKS.—This preparation is now, for the first time, introduced into this Pharmacopœia.

The virtues of sarsaparilla are found by experiment to reside almost exclusively in the cortical part, and may be extracted by cold water perhaps even better than by hot ; heat appearing to act unfavourably by dissipating some of the active principle.

The quantity of extract yielded by different specimens of sarsaparilla is very unequal, varying from 20 to 30 lbs. in one hundred weight, according to Mr. Brande.

I am informed by Mr. M'Kenna, that the product obtained at Apothecaries' Hall, the process being conducted as above directed, is, from the red Jamaica sarsaparilla of best description 13 per cent., and from the Honduras or white variety only $8\frac{1}{2}$ per cent. Recluz states the relative produce operating by both methods to be, by decoction 6 ounces from a pound, and by infusion 2 ounces 7 drachms.—See *Table at the end of this section*.

From the experiments of Mr. Pope and Mr. Battley, it appears, that of the different kinds, the red bearded Jamaica contained the greatest quantity of matter soluble in water, being double of that yielded by the others, and the Lisbon yielded the least ; the bark of the Jamaica yielded five times as much as the wood. The infusion of the woody part, when acted on by water acidulated with sulphuric acid, and concentrated, furnished crystals resembling discoloured ice.

It appears also from the experiments of Mr. Pope, "that by submitting the root, cut transversely, to the action of steam or of distilled water, at a temperature somewhat below boiling, an elegant soluble extract may be obtained containing all the virtues of the plant, not liable to decomposition, and applicable to the various purposes of extemporaneous prescription."

M. Galileo Palotta announced the discovery of the active principle of sarsaparilla, in the form of an alkaloid salt, which he named *Parigline*, and detailed a process for obtaining it pure, in the Jour. de Phar. tom. x: and Professor Folchi obtained from the medullary part a substance of a similar character, which he called *Smilacine*. Dr. Duncan regards the existence of this latter as very problematical, and the former as little less doubtful. I find that Hill, in his Hist. of Mat. Med. written in 1751, describes a process by which he obtained from sarsaparilla "*a fixed salt*," to which he says the effects of the remedy on the body are owing." p. 615.

The ancient Greeks appear to have been wholly ignorant of this drug. Dioscorides describes three species of smilax, but none of them agrees with that now in use, which is believed to have been first brought into Europe from Peru by the Spaniards. The cut surface of this extract, as it appears in the shops, is very generally covered by an immense number of saline spiculæ, which, according to Recluz, are crystals of common salt.

ADULTERATION OF SARSAPARILLA.—The sarsaparilla which is sold split and cut up in the shops, is very frequently mixed with the roots of the *Carex Arenaria*, known by the name of German sarsaparilla; these may be easily distinguished, according to Richard, by the thinness of their bark; they present also the marks of the insertion of the leaves, and are not wrinkled longitudinally: it is difficult to separate their bark from the woody part, which is very fibrous and grey, except the young roots, which are more amylaceous and white; this

root moreover splits lengthwise with difficulty, and the split portions break sharp when bent, contrary to what happens with sarsaparilla.

MEDICAL PROPERTIES AND USES.—The efficacy of sarsaparilla as a medicinal agent in any of its forms, has been from time to time loudly extolled, and again contemptuously denied; when it was first brought into these countries about the middle of the 16th century it was considered as an infallible remedy in syphilis, but it afterwards fell into disrepute until it was again brought forward by William Hunter and Fordyce: since then, and at present, it is regarded as a medicine of more than ordinary power, in the management of several chronic affections, particularly in the secondary forms, or the sequelæ of syphilis, so conveniently denominated syphilitoid diseases, in restoring the constitution after courses of mercury, and in scrofulous affections. Holding in solution small quantities of the muriate of mercury, it has been found beneficial in cases of chronic rheumatism attended with œdema. Whatever the merits of the remedy may be, the preparation here ordered is generally regarded as one of the worst, because one of the most inert forms in which the medicine can be given.

DOSE.—Ten grains to one drachm, in pills, or dissolved in some fluid preparation of the root.

FLUID EXTRACT OF SARSAPARILLA.

Take of the Root of Sarsaparilla, sliced, a pound,
Water, twelve pints.

Let them boil together for an hour, and pour off the liquor; then add twelve pints of water, and repeat the boiling and pouring off. Press strongly the liquor from the remaining material, set aside the mixed liquors that the fæces may subside; then evaporate the mixture by

continual boiling, down to thirty ounces, and add two ounces of rectified spirit.

REMARKS.—This formula is now introduced for the first time into this Pharmacopœia, and if the rule laid down at the commencement of this section be adhered to, it would either be impossible to make this preparation, or it should not find a place amongst the EXTRACTS being almost as fluid as the decoction.

It is not ordered by the other British Colleges, and would have been well omitted here, as from the excessive quantity of boiling and lengthened exposure to heat and air, the qualities of the root are so impaired as to render it almost altogether inert: it is besides very liable to spoil even when but a short time kept.

MEDICAL PROPERTIES AND USES.—See remarks on the solid extract. It is very often given as an adjunct to the decoction.

DOSE.—From one to four ounces.

EXTRACT OF THORN APPLE.

Take of the seeds the Thorn Apple, a pound,
Boiling Water, a gallon.

Digest for four hours in a vessel lightly covered; then take out the seeds, bruise them in an earthen mortar, and when bruised return them into the liquor: boil down to four pints, and having filtered the decoction reduce it to a proper consistence.

REMARKS.—This extract is now, for the first time, ordered in this Pharmacopœia: all the parts of the plant yield extract; but according to Dr. Marcet and others, that obtained from the seeds alone, is more efficacious in allaying pain.

These seeds were analyzed by M. Brandes, who discovered in them a peculiar alkaloid crystalline substance,

to which he gave the name of *Daturine*, and on which the efficacy of the preparations of this plant is supposed to depend.

According to Recluz, the proportion of extract to be obtained from those seeds is an ounce and a half from a pound. The product at Apothecaries' Hall is 12 per cent. of extract, which is stated to have very little coherence, and to be particularly liable to become mouldy.

MEDICAL PROPERTIES AND USES.—It is narcotic and anodyne. The late Dr. Marcet, of London, used this extract very extensively, and in a very valuable paper which he published on the subject, *Med. Chir. Trans.* vol. vii. p. 551, he states as the result of his experience, that the most common effect of this remedy in cases of chronic disease attended with severe pain, is to lessen powerfully, and almost immediately, sensibility and pain: to have rather a relaxing than an astringent effect upon the bowels; to have but little influence on the pulse; to produce but a transitory and inconsiderable dilatation of the pupil; and to have but little immediate tendency to produce sleep.

It has been given with advantage in maniacal paroxysms; it has also been successfully used in sciatica and chronic rheumatism: besides its internal administration for such complaints, the extract is sometimes used externally in the form of liniment, made by uniting it with olive oil.

Given in small doses it has been found to produce very beneficial effects in asthma, and in coughs which have a nightly exacerbation.

DOSE.—From one-fourth of a grain to five grains.

EXTRACT OF NUX VOMICA.

Take of Nux Vomica, scraped, eight ounces,
Proof Spirit, two pints.

Digest in a closed vessel for three days, filter the liquor and express what remains by a press; to this add a pint and a half of proof spirit, digest the mixture for three days and express the residuum: consume the mixed liquors by distillation, to a fourth part, and reduce to a proper consistence.

REMARKS.—This extract is now introduced for the first time into this Pharmacopœia, and is not ordered by the other British Colleges, but is much used on the continent.

The active matter of the *nux vomica* named *Strychnine*, is taken up by the spirit, but the extract contains also others of the constituents of the *nux vomica*, and these not always in the same relative proportions with the active principle, so that the extract is liable to vary in strength; for these reasons, preparations of more uniform activity might be had, by using the *Strychnine* itself, which may be procured with little more trouble and not more expense.

The product of extract is stated by Recluz to be an ounce and a quarter from 16 ounces of *nux vomica*: at Apothecaries' Hall the proportion obtained is 9 per cent.

MEDICAL PROPERTIES AND USES.—For these and the history of the plant, see *Tincture of Nux Vomica*, p. 419.

DOSE.—From half a grain to two or three grains.—See *Observations on the Doses*, p. 424.

All extracts while inspissating should be frequently stirred. They may be reduced to a proper consistence by a medium heat obtained by means of the vapour of boiling water. They should be kept so as to exclude as far as possible the contact of the air; the softer extracts should be sprinkled with rectified spirit.

TABLE shewing the relative quantities of Extract yielded by the several vegetables, from which Extracts are ordered to be prepared, according to the mode of operation adopted, &c. &c., principally selected from the very extended and valuable Table by Recluz.—*Dict. des Drogues, Simp. and Comp.* tom. ii. p. 500, et. seq.

Systematic Name.	Part employed dry or fresh.	Solvent used.	Mode of Operation.	Product of Extract obtained from 16 ounces.	Average.	Consistence of Product.		OBSERVATIONS.
						At first.	Afterwards.	
Artemisia Absinthium	Entire plant F.	Water.	Digestion at 86°.	From \mathfrak{z} iss to \mathfrak{z} iii \mathfrak{z} ii	\mathfrak{z} ii \mathfrak{z} iii	Pilular.	A little soft.	
Idem.	Idem.	Idem.	Infusion.	\mathfrak{z} ii to \mathfrak{z} ii \mathfrak{z} v	\mathfrak{z} ii \mathfrak{z} iiss	Idem.	Idem.	
Idem.	Idem. dry.	Idem.	Decoction.	\mathfrak{z} vi \mathfrak{z} v. gr. 24	o	Idem.	Idem.	
Idem.	Idem. Idem.	Alcoh. of Spec. Grav. 915	Maceration.	\mathfrak{z} viii \mathfrak{z} vi	o	Idem.	Idem.	
Aconitum Napellus ..	Leaves dry.	Water.	Digestion at 86°.	\mathfrak{z} iii \mathfrak{z} vi grs 54		Idem.	Pilular.	
Idem.	Idem. Idem.	Idem.	Decoction.	\mathfrak{z} vi to \mathfrak{z} viii	\mathfrak{z} vii	Idem.	Idem.	
Idem.	Id. Id. pulv.	Idem.	Infusion.	\mathfrak{z} vii \mathfrak{z} i.		Idem.	Idem.	
Alöe Spicata	Concrete Juice.	Idem.	Maceration.	\mathfrak{z} viii		Dry and brittle.	Constant.	
Anthemis Nobilis	Flowers dry.	Idem.	Digestion at 86°.	\mathfrak{z} ii \mathfrak{z} ii to \mathfrak{z} iii	\mathfrak{z} ii \mathfrak{z} v	Pilular.	Very hard.	
Idem.	Idem. Idem.	Alc. at 887.	Maceration.	\mathfrak{z} viii \mathfrak{z} vi		Idem.	Solid.	
Atropa Belladonna ...	Leaves dry.	Water.	Digestion at 77°.	\mathfrak{z} iv \mathfrak{z} vi	o	Pilular.	A little soft.	
Idem.	Idem. Fresh.	o	With the juice of 16 ounces of the plant.	\mathfrak{z} i \mathfrak{z} iii		Idem.	Very soft.	
Idem.	Idem. Idem.	o	Idem with Chlorophylle.	\mathfrak{z} iss to \mathfrak{z} i \mathfrak{z} v	\mathfrak{z} i \mathfrak{z} ivss	Idem.	Idem. ¹	1 But gets drier by the crystallization of the salts taking away some of its moisture.
Idem.	Idem. Dry.	Alc. at 915.	Maceration.	\mathfrak{z} v gr. 19		Idem.	Gets a little softer.	
Cinchona Oblongifolia	The bark dry.	Water.	Infusion.	\mathfrak{z} ii to \mathfrak{z} iii		Idem.	Constant. ²	2 Sometimes gets soft.
Idem. Idem.	Idem. Idem.	Alc. at 837.	Maceration.	\mathfrak{z} v to \mathfrak{z} vi	\mathfrak{z} vss	Idem.	Idem.	
Idem. Idem.	Idem. Idem.	Water.	Decoction.	Idem. Idem.	Idem.	Idem.	Idem.	
Cinchona Cordifolia. ...	Idem. Idem.	Idem.	Idem.	\mathfrak{z} iv to \mathfrak{z} vss	\mathfrak{z} iv \mathfrak{z} vi	Idem.	Idem.	
Idem. Idem.	Idem. Idem.	Idem.	Digestion at 86°.	\mathfrak{z} iiss to \mathfrak{z} iii	\mathfrak{z} iii	Idem.	Idem.	
Cinchona Condaminea	Idem. Idem.	Idem.	Idem.	\mathfrak{z} iss		Idem.	Idem. ³	3 Softened by exposure to the air.
Idem. Idem.	Idem. Idem.	Idem.	Infusion.	\mathfrak{z} ii to \mathfrak{z} iii		Idem.	Idem.	
Idem. Idem.	Idem. Idem.	Idem.	Decoction.	\mathfrak{z} iv to \mathfrak{z} v	\mathfrak{z} ivss	Idem.	Idem.	
Idem. Idem.	Idem. Idem.	Alc. at 915.	Maceration.	\mathfrak{z} iss to \mathfrak{z} iiss	\mathfrak{z} ii	Idem.	Idem.	
Idem. Idem.	Idem. Idem.	Water.	Idem.	\mathfrak{z} vii		Dry.	Idem. ⁴	4 Softens by exposure to the air.
Cucumis Colocynthis ..	Fruit dry and cleaned.	Idem.	Digestion at 115°.	\mathfrak{z} v \mathfrak{z} ivss		Pilular.	Idem. ⁵	5 Sometimes becomes solid afterwards.
Idem. Idem.	Idem.	Idem.	Infusion.	\mathfrak{z} ii to \mathfrak{z} iii \mathfrak{z} iss	\mathfrak{z} ii \mathfrak{z} iv gr. 54	Idem.	Gets soft. ⁶	6 Which depends on the place in which it is kept.
Idem. Idem.	Idem.	Idem.	Decoction.	\mathfrak{z} vi		Idem.	Solid. ⁷	7 After some time this extract becomes friable.
Idem. Idem.	Idem.	Alc. at 868.	Maceration.	\mathfrak{z} iii \mathfrak{z} ii gr. 24		Idem.	Dry.	
Idem. Idem.	Idem.	Idem. at. 842	Idem.	\mathfrak{z} i to \mathfrak{z} ii		Idem.	Idem.	
Conium Maculatum	Entire plant F.	Water.	Digestion at 113°.	\mathfrak{z} i to \mathfrak{z} iii	\mathfrak{z} ii	Pilular.	Very soft ⁸	8 Gets dry after some time, and full of crystals of muriate of soda, deprived of water.
Idem. Idem.	Idem. Idem.	o	From the juice with the Chlorophylle.	\mathfrak{z} i gr. 30.		Idem.	Pilular. ⁹	9 Experiences the same changes.
Idem. Idem.	Idem. Dry.	Water.	Infusion.	\mathfrak{z} iv \mathfrak{z} v to \mathfrak{z} vss	\mathfrak{z} v \mathfrak{z} ss	Idem.	Very soft.	
Idem. Idem.	Idem. Idem.	Alc. at 915.	Maceration.	\mathfrak{z} iv \mathfrak{z} vi grs. 54		Idem.	Pilular.	
Momordica Elaterium	Fresh fruit.	o	From the juice.	\mathfrak{z} v to \mathfrak{z} vi gr. 11	\mathfrak{z} v grss.	Idem.	Idem.	

Table shewing Products of Extract, &c. continued.

Systematic Name.	Part employed dry or fresh.	Solvent used.	Mode of Operation.	Product of Extract obtained from 16 ounces.	Average.	Consistence of Product.		OBSERVATIONS.
						At first.	Afterwards.	
Gentiana Lutea	Root dry.	Alc. at 897.	Maceration.	3vi 3vi		Pilular.	Constant.	
Idem. Idem.	Idem. Idem.	Water.	Digestion at 86°.	3viii to 3x		Idem.	Idem.	
Idem. Idem.	Idem. Idem.	Idem.	Infusion.	3vss to 3viiss	3viss	Idem.	Idem.	
Glycyrrhiza Glabra ..	Idem. Idem.	Idem.	Digestion at 140°.	3iii to 3iv	3iiiss	Dry.	Soft.	
Idem. Idem.	Idem. Idem.	Idem.	Decoction.	3viii		Pilular.	Constant.	
Idem. Idem.	Idem. Idem.	Alc. at 915.	Maceration.	3iv.		Dry.	Soft.	
Hæmatoxylum Campechianum	The wood rasped.	Water.	Decoction.	3ii 3viss		Hard.	Constant.	
Humulus Lupulus ..	The strobiles dry.	Idem.	Digestion.	3iss		Pilular.	Idem.	
Idem. Idem.	Root dry.	Idem.	Infusion.	3iv		Idem.	Idem.	
Idem. Idem.	Idem. Idem.	Alc. at 868.	Maceration.	3v		Idem.	Idem.	
Hyoscyamus Niger ..	Entire plant dry.	Water.	Digestion at 104°.	3iv		Idem.	Soft.	
Idem. Idem.	Idem. Idem.	o	Juice depurated.	3ss to 3i	3vi	Idem.	Idem.	
Idem. Idem.	Idem. Idem.	o	Idem with Chlorophylle.					10 Gets dry, and contains crystals of nitre and common salt.
Idem. Idem.	Idem. Idem.	Alc. at 915.	Maceration.	3vii to 3i 3ii		Idem.	Idem. ¹⁰	
Idem. Idem.	Idem. Idem.	Water.	Decoction.	3iii 3vi grs. 48		Idem.	Idem.	
Convolvulus Jalapa ..	Root dry.	Alc. at 897.	Maceration.	3iii 3ii	3ivss	Idem.	Constant. ¹¹	11 This resinous extract, like those of colocynth and scammony, submitted to distillation with alcohol, lose by the operation their purgative properties which pass to the alcoholate, but in a much less degree.
Idem. Idem.	Idem. Idem.	Idem. at 837.	Idem.	3iii to 3vi		Dry.	Idem.	
Strychnos Nux Vomica	Seeds scraped.	Alc. at 897.	Maceration.	3i 3v to 3ii 3iiss	3i 3i grs. 54	Pilular.	Very soft.	
Papaver Somniferum	Capsules.	Water.	Digestion at 86°.	3ii to 3v	3iiiss	Idem.	Gets soft. ¹²	12 Grows dry after some time.
Idem. Idem.	Idem.	Idem.	Infusion.	3ii 3vi		Idem.	Idem.	
Rheum Palmatum .	Root dry.	Idem.	Digestion at 122°.	3x		Pilular.	Gets dry.	
Idem. Idem.	Idem. Idem.	Alc. at 897.	Maceration.	3iiiss to 3v 3iss	3iv 3ii grs. 54	Dry.	Constant.	
Rheum Undulatum ..	Idem. Idem.	Idem. at 903.	Idem.	3ivss		Idem.	Idem.	
Ruta Graveolens	Entire plant dry.	Water.	Infusion.	3ii 3vii		Pilular.	Soft. ¹³	13 Contains common salt.
Idem. Idem.	Leaves fresh.	Idem.	Decoction.	3i 3iii		Idem.	Idem.	
Sambucus Nigra ..	Berries fresh.	o	Juice inspissated.	3ii		Idem.	Constant.	
Smilax Sarsaparilla ..	Root dry.	Water.	Decoction.	3vi		Idem.	Firmer.	
Idem. Idem.	Idem.	Idem.	Infusion.	3ii 3vii		Idem.	Idem. ¹⁴	14 After a time it contains crystals of sea salt.
Spartium Scoparium ..	Leaves fresh.	Idem.	Decoction.	3i 3iii		Idem.	Idem.	
Datura Stramonium ..	Leaves fresh.	o	Juice inspissated.	3ss		Idem.	Very soft.	
Idem. Idem.	Idem. Dry.	Alc. at 915.	Maceration.	3ii 3ii		Idem.	Grows soft. ¹⁵	15 Crystals of nitrate of potash are found in its interior.
Idem. Idem.	Seeds dry.	Water.	Decoction.	3iss		Idem.	Idem.	
Leontodon Taraxacum	Leaves dry.	Water.	Digestion at 86°.	3iii		Idem.	Very soft.	
Idem. Idem.	Idem. Fresh.	o	Juice inspissated.	3iii grs. 54		Idem.	Idem.	
Idem. Idem.	Idem. Idem.	Water.	Decoction.	3iii to 3iv		Idem.	Pilular.	

SECTION IX.

COMPOUNDS.

POWDERS.

THE substance to be reduced to powder; having been previously dried, must be beaten in an iron mortar; the powder is to be shaken through a hair sieve, and should be kept in well stopped vessels.

REMARKS.—Some observations have already been made on the manner of preparing vegetable substances which are intended to be reduced to powder; see p. 333, where Mr. Battley's method of drying vegetables for this purpose, is detailed.

The degree of fineness to which different substances ought to be reduced in order to obtain their utmost efficacy, affords matter of curious and probably very important speculation: some substances having their activity increased by reduction to the impalpable form, as for instance, jalap, and scammony; while others have their activity impaired by such an operation, such for instance, are cinchona, rhubarb, guaiacum, and in the opinion of some, ipecacuanha also.—See *Remarks on Cinchona*, p. 504.

Dr. Paris proposes as a rule on this subject, that “extreme pulverization *assists* the operation of all substances whose active principles are not easily soluble, and of compound powders, whose ingredients require for their activity an intermixture; whilst it certainly

injures, if it does not destroy, the virtues of such as contain, as their active constituent, a volatile principle, which is easily dissipated, or extractive matter, which is easily oxidized."—*Pharmacologia*, vol. i. p. 356.

The following rules ought, as far as possible, to be observed, in the preparation of compound powders. 1. Substances of different degrees of solidity or cohesion ought to be powdered separately, and afterwards mixed by trituration.* 2. Deliquescent salts ought not to enter into the composition of powders, because by their absorption of moisture from the air, the powders become damp, and spoil. 3. Emulsive seeds ought to be excluded; the oil which they contain, in a short time becomes rancid, and communicates a disagreeable odour to the powder; if, however, these seeds are prescribed, they should not be mingled with the powder, until it was about to be used. 4. When essential oils make part of a powder, they should be first combined with sugar, constituting an oleo-saccharum, which is to be powdered by trituration. 5. When very heavy metallic substances enter into the composition of powders, they should be reduced by means of a porphyry slab to a very fine powder, then mixed as perfectly as possible with the other ingredients of the powder, and afterwards disturbed as little as possible, lest, by their specific gravity, they sink to the bottom. 6. When a powder is composed of several others, after mixing the prescribed quantities of each, they should be passed through a sieve, the meshes of which are wider than those of the sieve through which the powders were passed at first. 7. When the powder is composed of different mineral substances, after having mixed them completely, they should be reduced to as fine a powder as possible, on the porphyry slab. 8. Powders ought to be

* This of course is not intended to apply to those cases, where one substance is made a means of pulverising another more minutely by its greater hardness, as in the compound powders of ipecacuan and of jalap.

kept in very dry bottles, well stopped, and covered with coloured paper, so as to keep them from exposure to air or light, by which some of them are very rapidly altered in their properties.

The reduction of different substances to powder is attended with a loss of a certain proportion of the quantity operated on, and the following table, published by M. Henry, in the *Annales de Chimie*, shews the loss sustained in this way, by some of the substances most in use:

Names of the substances.	Quantity employed.	Product in Powder.	Loss.
Ipecacuanha . . .	100 parts.	87	13
Jalap	idem.	92	8
Rhubarb	idem.	93.800	6.200
Squill	idem.	87.500	12.500
Cinchona	idem.	93.700	6.300
Gum Arabic	idem.	93.500	6.500
Scammony	idem.	95.	5
Cantharides	idem.	92.700	7.300
Sal Ammoniac . . .	idem.	98	2
Cream of Tartar . .	idem.	97	3
Antimony	idem.	97	3
Gum Tragacanth . .	idem.	93.600	6.400
Canella	idem.	93.600	6.400

POWDER OF ALOES WITH CANELLA.

Take of Hepatic Aloes, a pound,
Canella Bark, three ounces.

Powder them separately, and then mix.

REMARKS.—This compound is not eligible for administration in the form of powder, from the very disagreeable taste of the aloes, which is but imperfectly

concealed by the Canella : it is more adapted to the form of pills. It has been long known by the name of *Hiera Picra*.

MEDICAL PROPERTIES AND USES.—It is a warm cathartic, but seldom prescribed. It is a popular domestic remedy, infused in wine or spirits.

DOSE.—From ten to twenty grains.

COMPOUND POWDER OF ALOES.

Take of Hepatic Aloes, an ounce and half,
Guaiacum Gum-resin, an ounce,
Aromatic Powder, half an ounce.

Reduce the Aloes and Guaiacum separately to powder, and then mix them with the Aromatic powder.

REMARKS.—The same objection applies to this powder as to the former.

MEDICAL PROPERTIES AND USES.—It is a warm cathartic, and intended to combine the sudorific effect of the Guaiacum with the purgative property of the Aloes, but it is so very nauseous that it is seldom ordered ; and if given at all may be best taken in the form of pills.

DOSE.—From ten to twenty grains.

AROMATIC POWDER.

Take of Cinnamon Bark, two ounces,
Cardamom seeds, freed from their capsules,
Ginger, of each, an ounce,
Long Pepper, a drachm.

Rub them together into powder.

REMARKS.—This is the Pulvis Cinnamomi compositus of the London Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is a warm carminative, seldom prescribed alone, but as an adjunct to give warmth to other preparations, as in the last formula: but it does not generally, says Mr. Brande, bind well with pill masses, and where an aromatic addition is wanted in draughts or mixtures, the aromatic confection is preferable.

DOSE.—From five to twenty grains.

COMPOUND POWDER OF ASARABACCA.

Take of the leaves of Asarabacca dried, an ounce,
Lavender Flowers, dried, a drachm.

Reduce them together to powder.

REMARKS.—MM. Feneulle and Lassaigne have analyzed the *Asarum europæum*, and found in it a yellow matter analogous to *Cytisine*, which appears to be its active principle, and is said to be emetic.

From the strongly emetic property of the fresh leaves and root, the Asarum was supposed to contain *emetine*, but the experiments instituted for the purpose have not detected that principle in it.

The powder of Asarum is generally supposed to constitute the basis of the *Cephalic Snuff*.

MEDICAL PROPERTIES AND USES.—It is used as an errhine; snuffed up the nostrils it produces a considerable discharge and frequent sneezing, and has been found useful in headach and ophthalmia.

DOSE.—From five to eight grains, snuffed up the nostrils.

COMPOUND POWDER OF CHALK.

Take of Prepared Chalk, half a pound,
Cinnamon Bark, four ounces,
Tormentil Root,
Gum Arabic, of each three ounces,
Long Pepper, half an ounce.

Reduce them to powder separately, and then mix them well together.

MEDICAL PROPERTIES AND USES.—This compound is antacid, astringent, and carminative, and is given with advantage in diarrhœa, particularly if connected with acidity; and in weak states of the stomach.

DOSE.—From five to thirty grains, in some carminative water, and rubbed up with mucilage.

COMPOUND POWDER OF CHALK WITH OPIUM.

Take of Compound Chalk Powder, six oz. and a half,
Hard Opium, powdered, four scruples.

Mix.

REMARKS.—Forty grains of this powder consist of thirty-nine grains compound chalk powder, and one grain of opium.

MEDICAL PROPERTIES AND USES.—Like those of the former powder; it acquires however additional power from the opium, in allaying intestinal irritability, which it sometimes very happily accomplishes in the bowel complaints of children.

DOSE.—For an adult, from twenty to forty grains. For children, from two grains to ten, according to the age.

POWDER OF BURNT HARTSHORN.

Burn pieces of Hartshorn until they become white; then reduce them to as fine a powder as possible.

REMARKS.—Chevallier recommends the process proposed by M. Planche as the best for burning the hartshorn, as above directed: it is as follows: “Place on the grate of a reverberatory furnace a layer of wood charcoal, two inches deep, and fill the body of the furnace with the pieces of hartshorn, with sufficient space between the pieces for the air to pass through them freely: then put on the dome of the furnace, and with its chimney connect an iron pipe: lute the joinings of the furnace; kindle the charcoal, which will soon set the horn on fire, and then the operation proceeds by itself, and is finished, when there is no longer any flame observed to issue from the iron pipe. After the furnace has cooled, take out the pieces of hartshorn, and select the whitest for reduction to powder: The blackened or bluish pieces are to be finely pulverised and put into a crucible, and heated to a red heat for half an hour, taking care to stir them from time to time with an iron rod: by this new operation they will acquire the desired whiteness.—*Dict. des Drogues Simp. et Comp.* tom. ii. p. 200.

If too high a temperature be used in this operation, the horn becomes vitrified and very hard, which both prevents the internal parts from being completely burnt, and changes the character of the product.

According to Guillot, the residue from 100 parts of hartshorn, after calcination, consists of 57.5 of phosphate of lime, one of carbonate of lime, and a minute portion of phosphate of magnesia.

The minute pulverization of this substance ought to be accomplished by the use of the porphyry slab.

MEDICAL PROPERTIES AND USES.—From its white earthy appearance, this powder was formerly considered as an absorbent earth; but a knowledge of its composition has set aside that idea, and suggested its use, combined with phosphate of soda, as a remedy in rachitis, a disease depending on a deficiency of phosphate of lime in the bones, in which it is reported to have done good.

DOSE.—Ten grains to thirty or more.

COMPOUND POWDER OF IPECACUANHA.

Take of Ipecacuanha root,

Turkey Opium, of each reduced to powder,
one drachm.

Sulphate of Potash, one ounce.

Rub the Sulphate of Potash with the Opium into powder, then mix in the Ipecacuanha.

REMARKS.—This is the composition well known in practice by the name of *Dover's Powder*. It does not however agree in composition with the original remedy, as directed by Dr. Dover, whose receipt was as follows: "Take opium an ounce; saltpetre, tartar vitriolated, of each four ounces; ipecacuan one ounce; liquorice one ounce. Put the saltpetre and tartar into a red hot mortar, stirring them with a spoon until they have done flaming. Then powder them very fine. After that slice in your opium: grind these to a powder, and then mix the other powders with these. DOSE, from forty to sixty or seventy grains in a glass of white wine posset, going to bed, covering up warm, and drinking a quart or three pints of the posset-drink while sweating."—*The Ancient Physician's Legacy to his Country*, Lond. 1762, p. 14.

The nitre is still retained as an ingredient in the formula of the French codex. The Pharmacopœia Danica and the P. Austriaca, order sugar instead of any salt; but it is less calculated to assist in the pulverization of the opium, and is apt also to attract moisture and convert the powder into a solid mass.

The following Table shews the proportion of opium in this powder, as ordered in the principal Pharmacopœiæ of Europe:

Dublin.	London.	Edinburgh.	French.	Swedish.	Danish.	Prussian.	Austrian.
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{11}$	$\frac{1}{60}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

This combination, as remarked by Dr. Paris, affords one of the best examples of the power which one medicine possesses of so changing the action of another, as to produce a remedy of new properties; in this powder the opium is so modified, that it may be given with perfect safety and advantage in inflammatory affections accompanied with increased vascular action: it would seem that whilst the opium increases the force of the circulation, the ipecacuan relaxes the exhalant vessels and causes a copious diaphoresis: the sulphate of potash is also an important ingredient, for experience has fully proved that ipecacuan and opium, in the same proportions, have not so powerful an effect without it; yet its action seems to be purely mechanical, dividing and mixing the active particles more intimately; and it appears that the success of the remedy depends very much upon its being very finely powdered.

MEDICAL PROPERTIES AND USES.—It is one of the most certain and powerful sudorifics we possess, and as

such was recommended by Dr. Dover in rheumatism ; it has been found equally useful in dropsy and several other affections, where an increase of the cutaneous discharge was desirable : it acts very favourably also in allaying intestinal irritation and abating pain.

Dose.—From five to twenty grains.

COMPOUND POWDER OF JALAP.

Take of the Powder of Jalap Root, half a pound,
Bitartrate of Potash, a pound.

Rub them together into a very fine powder.

REMARKS.—This powder is now introduced into this Pharmacopœia for the first time, and is copied from that of Edinburgh. The bitartrate of potash has not only the effect of dividing the jalap more minutely, for which purpose they are ordered to be triturated together, but it also modifies its purgative operation.

MEDICAL PROPERTIES AND USES.—It is a very useful hydragogue purgative, and is given with advantage in habitual costiveness, worm cases, and in some forms of dropsy ; I have seen it produce very excellent effects in the dropsy which not unfrequently supervenes in children after scarlatina.

Dose.—Twenty to thirty grains.

COMPOUND POWDER OF KINO.

Take of Kino, fifteen drachms,
Cinnamon Bark, half an ounce,
Hard Opium, a drachm.

Reduce them separately into very fine powder, and then mix.

REMARKS.—This powder is now, for the first time, ordered by the Dublin College, and is copied from the London Pharmacopœia.

Twenty grains of it contain one grain of opium.

MEDICAL PROPERTIES AND USES.—From the large proportion of Kino, this powder is strongly astringent, which effect is increased, and anodyne powers added by the opium: Mr. Brande says it is applicable in some dyspeptic affections, and in the milder forms of pyrosis.

DOSE.—From five grains to twenty.

COMPOUND SALINE POWDER.

Take of Pure Muriate of Soda,

Sulphate of Magnesia, of each four parts.

Sulphate of Potash, three parts.

Having first dried the salts with a gentle heat, rub them to a fine powder, at first separately, and afterwards together, and keep them in a well closed vessel.

REMARKS.—This powder is now introduced for the first time into this Pharmacopœia, from that of Edinburgh.

MEDICAL PROPERTIES AND USES.—It is a convenient saline purgative for persons habitually costive, taken to the extent of one or two tea-spoon fulls in half a pint of water before breakfast.

DOSE.—Two drachms to six.

COMPOUND POWDER OF SCAMMONY.

Take of Scammony,

Hard Extract of Jalap, of each two ounces,

Ginger, half an ounce,

Reduce them separately to a very fine powder, then mix together.

REMARKS.—In the *Specimen Pharmacopœiæ* of 1794, a compound powder of scammony was ordered, in which sulphate of potash was used instead of the hard extract of jalap: the present formula, now introduced for the first time, is copied from that of the London College, and is preferable to that of Edinburgh, which contains no ginger, and consists of scammony and cream of tartar in equal parts.

MEDICAL PROPERTIES AND USES.—It is purgative, and is considered chiefly useful in hydropic and worm cases. The addition of a grain of calomel to five of this powder, renders it something like the old *Pulvis basilicus*, a good active purge for the removal of viscid mucous slime from the bowels of children. Every five grains contain two grains of scammony, two of jalap, and half a grain of ginger.

DOSE.—Ten grains to fifteen.

POWDER OF SQUILL.

Remove the membranous integuments from the bulb of the squill, cut it into slices and dry with an inferior heat; then reduce them to powder, which ought to be kept in glass bottles with ground stoppers.

REMARKS.—Guillemin recommends the rejection of the outer layers of the bulbs as containing very little of the active principle; and of the innermost ones as too

soft and mucilaginous: the intermediate layers should be sliced, strung on a thread, and dried in the prescribed temperature of between 90° and 100° Fahrenheit, by which they lose about four-fifths of their weight, with very little alteration in the active power of the remedy, the parts which exhale appearing to be merely watery; hence six grains of the dry root are equivalent to half a drachm of it when fresh.

The dried bulbs or powder should be kept in a dry place, otherwise they will become soft and mouldy, and it is better to powder them only in small quantities at a time, as occasion may require.

MEDICAL PROPERTIES AND USES.—It is expectorant, emetic, and diuretic; the latter effect may be greatly increased by combining it with mercurials, as calomel or blue pill, in which form, and with the addition of digitalis and opium, it constitutes one of our most powerful and certain diuretic remedies.

DOSE.—One grain to four.

POWDER OF BURNT SPONGE.

Having cut sponge into pieces, beat it to free it from little stones; burn it in a closed iron vessel until it becomes black and friable, and reduce it to powder.

REMARKS.—M. Chereau prefers keeping the sponge on the fire only till it is roasted. It then gives a straw-coloured powder. His reason is, that, given in the same doses as the black charred sponge, it has uniformly produced more certain effects in swellings of the thyroid gland (*body*.) Whether this arise from the torrified sponge retaining more of the iodine, has not been determined.

The powder of burnt sponge consists of charcoal,

with portions of phosphate and carbonate of lime, carbonate of soda and iodine in the form of hydriodate of soda : it ought, when properly prepared, to give purple fumes when sulphuric acid is poured upon it, and the mixture heated in a glass tube.

MEDICAL PROPERTIES AND USES.—It is considered tonic, deobstruent and antacid. It has been much recommended in bronchocele, scrofulous affections, and herpetic eruptions; and Dr. A. T. Thomson mentions having witnessed its efficacy in schirrous testicle, when given in combination with cinchona bark.

It is generally given in the form of an electuary, with powdered cinnamon and honey. In bronchocele the patient is directed to swallow the electuary very slowly, from a supposition that some local effect is produced.

DOSE.—One drachm to three.

PILLS.

REMARKS.—This form for the administration of medicine is best suited to those substances which operate in small quantities; and are insoluble, or difficultly soluble in aqueous vehicles : 2. Those that are very nauseous : 3. Substances which are not intended to act until they reach the large intestines, as in pills for habitual costiveness.

Pills are usually sprinkled over with starch, liquorice powder, magnesia, powdered cinnamon or lycopodium; or covered with gold or silver leaf, for the purpose of preventing their sticking together, and concealing any nauseous taste which they might otherwise have.

The use of magnesia for such a purpose is objected to by Dr. Paris, where calomel is present, as he says he has satisfied himself that under such circumstances a muriate of magnesia is formed; to which partial decom-

position is owing the greenish hue which the surface of the pill exhibits : Pharmacologia, vol. 1. p. 366 ; and the gold or silver leaf ought not to be applied to pills which contain preparations of mercury or sulphur.

Pill masses ought not to be made in a large quantity at a time, for if originally of a proper consistence, they become too hard, or undergo other changes which render them unfit for use. Such masses are best kept in bladders, which should be moistened from time to time with some of the same kind of liquid that the mass was made up with, or with some suitable aromatic oil.

COMPOUND PILLS OF ALOES.

Take of Hepatic Aloes, an ounce,
Extract of Gentian, half an ounce,
Oil of Caraway, forty drops,
Simple Syrup, a sufficient quantity.

Beat them together into a mass.

REMARKS.—This formula is now, for the first time, introduced into this Pharmacopœia from that of London, in place of the *Pilulæ Aloes cum Zingibere* of the former edition of 1807.

The addition of syrup is altogether unnecessary and inadmissible ; for when the extract of gentian and the aloes are triturated together, they re-act upon each other, and become too soft to form pills ; so that the addition of some powder is necessary to give the mass sufficient consistence.

MEDICAL PROPERTIES AND USES.—These pills are a warm and stomachic laxative, and well suited to obviate the costiveness so often an attendant on sedentary habits.

DOSE.—Ten grains to fifteen.

PILLS OF ALOES WITH MYRRH.

Take of Hepatic Aloes, two ounces,
 Saffron,
 Myrrh, of each an ounce,
 Simple Syrup, a sufficient quantity.

Reduce the aloes and myrrh to powder separately, then beat all together into a mass.

REMARKS.—This is a very ancient composition, being mentioned by Rhazes, and now universally known by the name of *Rufus' Pill*.

MEDICAL PROPERTIES AND USES.—It is a warm, stimulant, cathartic, very frequently used in chlorotic habits with advantage; for such patients it is often combined with the sulphate or some other preparation of iron.

DOSE.—Ten grains to twenty.

COMPOUND PILLS OF CALOMEL.

Take of Calomel,
 Brown Antimoniated Sulphur, of each a
 drachm,
 Guaiac Resin, reduced to powder, two
 drachms.

Rub them together so that they may be thoroughly mixed, then add as much treacle as may be sufficient to form them into a mass of the proper consistence.

REMARKS.—This formula, though long established in practice, is now introduced for the first time into this Pharmacopœia, and the word *Calomel* is used instead of *hydrargyri submuriæ*, as in the other Pharmacopœiæ, to

prevent mistake. This combination is very generally known by the name of Plummer's pill, as it was originally at his recommendation received into the Edinburgh Pharmacopœia: five grains of the mass contain something more than a grain of calomel.

MEDICAL PROPERTIES AND USES.—These pills are alterative and diaphoretic; they are much used in affections of the skin, particularly of a syphilitic character. They sometimes affect the bowels, in which case a small quantity of opium should be added.

DOSE.—Five grains to ten.

COMPOUND PILLS OF COLOCYNTH.

Take of Hepatic Aloes,

Scammony, of each an ounce,

Pulp of Colocynth, half an ounce,

Castile Soap, two drachms,

Sulphate of Potash,

Oil of Cloves, of each a drachm,

Treacle, a sufficient quantity.

Reduce the aloes and scammony into a powder with the sulphate of potash, then mix together the colocynth pulp and the oil, and finally, rub all together into a mass with the soap and treacle.

REMARKS.—The Sulphate of Potash has been introduced into this formula, merely as an agent for the more complete division of the aloes and scammony.

MEDICAL PROPERTIES AND USES.—These pills are a very useful purgative, and are more active in their operation than the other aloetic pills: they are much used in habitual costiveness and in chlorosis.

DOSE.—From eight to twenty grains.

COMPOUND PILLS OF IRON.

Take of Myrrh, in powder, two drachms,
Carbonate of Soda,
Sulphate of Iron,
Raw Sugar, of each a drachm.

Rub the myrrh with the carbonate of Soda, then add the sulphate of iron and sugar, and with treacle form them into a mass.

REMARKS.—This formula is now introduced for the first time into this Pharmacopœia, and is copied from that of London, with the exception of the treacle, which is an unnecessary addition, as the ingredients, merely by trituration, so react upon each other that the mass becomes rather too soft for forming pills, but becomes afterwards extremely hard by keeping.

This composition is completely analogous to the *Mistura Ferri Composita*, or *Griffith's mixture*, for which it may be regarded as a substitute in the solid form.

MEDICAL PROPERTIES AND USES.—These pills are tonic and emmenagogue, and are used in dyspepsia and chlorosis.

DOSE.—From ten to twenty grains.

COMPOUND PILLS OF GALBANUM.

Take of Galbanum, an ounce,
Myrrh,
Sagapenum, of each an ounce and a half,
Assafœtida, half an ounce,
Treacle, a sufficient quantity.

Beat them all together into a mass.

REMARKS.—This formula is now substituted for the *Pilulæ Myrrhæ Compositæ* of the former edition of 1807, and is copied from the London Pharmacopœia. A similar combination in the Edinburgh Pharmacopœia is much more appropriately called *Pilulæ Assafœtidæ Compositæ*, as the assafœtida is the most powerful ingredient.

MEDICAL PROPERTIES AND USES.—This combination of fœtid gums is chiefly prescribed in hysteria and chlorosis, and might be for such purposes conveniently combined with the *Pil. Ferri. Comp.* or with *Rufus'* pill.

DOSE.—Ten grains to twenty.

COMPOUND PILLS OF GAMBOGE.

Take of Gamboge, a drachm,
Hepatic Aloes, a drachm and a half,
Ginger, half a drachm,
Soap, two drachms.

Having powdered the gamboge, aloes, and ginger, separately, mix them, and with treacle form a mass.

REMARKS.—This is a simplification of a formula originally proposed by Dr. George Fordyce; by combining the gamboge with aloes, its too ready solubility is obviated, and it is prevented from affecting the stomach as it otherwise would.

MEDICAL PROPERTIES AND USES.—These pills are actively purgative: five grains of the mass contain about one grain of gamboge.

DOSE.—Ten grains to fifteen.

PILLS OF MERCURY.

Take of Purified Mercury, two drachms,
Conserve of Roses, three drachms,
Extract of Liquorice, reduced to fine powder, a drachm.

Rub the mercury with the conserve of roses until the globules shall have entirely disappeared; then add the powdered liquorice, and mix all together.

REMARKS.—The state in which the mercury exists in this preparation, is by no means agreed on; some considering it to be merely in a state of minute mechanical division, whilst others maintain its conversion into the black oxide: that this change does take place to a certain extent appears most probable, and that the efficacy of the remedy is owing to the protoxide so formed: for mercury in its metallic state is entirely inert with regard to the living system.

This oxidation is effected more readily when the surface of the metal is extended, and its continuity divided by the interposition of any viscous matter: several such substances have been recommended for the purpose, as syrup, honey, mucilage, &c. But all the colleges have agreed in ordering conserve of roses, as superior to the others for facilitating the operation.

Dr. Paris observes, that a small proportion of sulphuric acid is sometimes added to the conserve of roses to brighten its colour, in consequence of which the mercurial pill made with it may contain, in varying proportions, some of that highly deleterious compound, the *subsulphate* of mercury.

As the efficacy of this remedy depends upon the complete extinction of the metal, it is of great consequence that the trituration should be continued until

that is accomplished, which may be known by rendering some of the mass thinner by the addition of a little water, and spreading it on paper or a plate of glass, when it ought not to exhibit any metallic globules.

When it is brought to this state, it is necessary, as above directed, to mix with the mass a proportion of some dry powder, to give it a proper degree of consistency: but the powder of liquorice, though generally used, is not the best adapted for the purpose, as it is apt to become mouldy and cause the pills to spoil: the Edinburgh College orders starch, which is a very unalterable substance.

Three grains of the mass contain one grain of mercury.

MEDICAL PROPERTIES AND USES.—The *Blue pill*, as this is generally called, is stimulant, purgative, alterative, and antisymphilitic; and is perhaps the most eligible form for the internal administration of mercury, particularly when the intention is to produce the general action of this metal on the system; being much less liable to run off by the bowels than any of the other forms of the remedy, while at the same time it is sufficiently active and certain.

Should it act on the bowels, this may be corrected by the addition of a small quantity of opium; or sometimes a few grains of rhubarb given every morning, will enable the intestines to resist the mercurial irritation. In cases where the form of pill is objectionable, it may be suspended by the aid of mucilage in an aqueous vehicle. The various applications of this remedy in practice, are altogether too numerous to be even enumerated here.

DOSE.—Five grains to twenty.

PILLS OF SOAP WITH OPIUM.

Take of Turkey Opium, half an ounce.

Hard Soap, two ounces.

Beat them together to form a mass.

REMARKS.—This formula is now introduced for the first time into this Pharmacopœia, from that of London, and does not appear a very necessary addition while the *Pilulæ e Styraçe* are retained.

Five grains of the mass contain one grain of opium.

MEDICAL PROPERTIES AND USES.—Those of opium: the addition of the soap enabling the pills, though long kept, to retain their solubility in the stomach.

DOSE.—Three grains to ten.

COMPOUND PILLS OF SQUILL.

Take of the Powder of Squill, recently dried, a drachm,

Powder of Ginger,

Hard Soap, of each three drachms,

Gum Ammoniac, two drachms.

Mix the powders, then add the soap and the ammoniac, and with treacle make a mass of a proper consistence.

REMARKS.—This formula is introduced from the London Pharmacopœia, instead of the *Pilulæ Scillæ cum Zingibere* of the former edition of this Pharmacopœia, which contained neither soap nor ammoniac. The proportion of the squill, which is the active constituent, is very different, being in the former formula one grain in three, in the present only one grain in nine.

MEDICAL PROPERTIES AND USES.—These pills are useful expectorants in chronic, catarrh, and asthma; or combined with calomel and digitalis in dropsical affections. They are liable to the same objections as the squill powder; the efficacy of the squill being impaired by keeping in either form.

DOSE.—Five grains to twenty.

STORAX PILLS.

Take of Storax Resin, three drachms,
Turkey Opium,
Saffron, of each a drachm.

Beat them together till they are well mixed.

REMARKS.—The storax and saffron are merely intended to conceal the smell and flavour of the opium, but do not interfere with, or alter its effect: the name given to the pills is sometimes of advantage in prescribing for persons who are prejudiced against opium.

Five grains of the mass contain one grain of opium.

MEDICAL PROPERTIES AND USES.—Sedative and anodyne.

DOSE.—Five grains to ten.

ELECTUARIES.

The fruits, the pulps of which are to be extracted, if unripe, or ripe and dried, are to be boiled in a little water that they may become soft; then the pulps being expressed through a sieve, are to be reduced by a slow evaporation to a proper consistence.

REMARKS.—Electuaries are mixtures of vegetable or light earthy powders, combined by means of honey, syrup, or treacle, so as to form masses of a consistence about that of thick honey: all substances of this description may therefore be made into electuaries; but as the intention of this form of medicine is to render remedies as palatable as possible, those matters only can be employed to form electuaries, the taste of which is not too ungrateful to be covered by honey or syrup.

They are more active remedies than conserves; but still the more powerful vegetable substances cannot well be exhibited in this form, on account of their taste; and the metallic salts are too ponderous to remain suspended in honey or syrup.

In making electuaries, the degree of consistence must always be regulated by the nature of the substances which enter into them; but as a general rule, the consistence should be such that the mass shall neither be too stiff to swallow, nor so thin as to allow the powders to separate, and that a dose may be easily taken up on the point of a knife.

The quantity of syrup required by different substances to give them the proper consistence, is thus stated by Dr. Duncan:

Powders from vegetables and other dry substances	}	1 part requires of syrup 3 parts.
Gum Resins ..	1	1
Resins ..	1	$\frac{3}{4}$
Mineral substances which do not absorb water, as antimony and calomel	}	$\frac{1}{2}$
Salts ..	1	$\frac{1}{2}$
Alkalies and earths which deliquesce spontaneously	}	$\frac{1}{10}$

It should be recollected, that the quantity of syrup which on first mixing the ingredients of an electuary,

appears quite sufficient to make it of the proper consistence, will not be sufficient to keep it so, but will, after a few days, require a considerable addition.—See *Electuary of Scammony*, p. 554.

ELECTUARY OF CASSIA.

Take of the Pulp of Cassia, recently expressed, half a pound,
Manna, two ounces,
Pulp of Tamarinds, an ounce,
Syrup of Orange Peel, half a pound.

Having bruised the manna, dissolve it in the syrup with a medium heat, then add the pulps, and let the mixture by slow evaporation be reduced to a proper consistence.

REMARKS.—This confection is but little used, as it is expensive, and has very little activity. It is very liable to become sour by keeping.

MEDICAL PROPERTIES AND USES.—It is gently laxative, and is occasionally used as a purge for children, or as a vehicle for some more active medicine.

DOSE.—From one drachm to one ounce.

COMPOUND ELECTUARY OF CATECHU.

Take of Catechu, four ounces,
Cinnamon Bark, two ounces,
Kino, three ounces.

Reduce these to a powder, and add of

Turkey Opium, diffused in Spanish white
wine, a drachm and a half,

Syrup of Ginger, boiled to the consistence
of honey, two pounds and a quarter.

Mix.

REMARKS.—An ounce of this compound contains
two grains and a half of opium.

MEDICAL PROPERTIES AND USES.—This electuary
includes some of the most active vegetable astringents,
rendered more grateful by aromatics and more powerful
by the opium; it is chiefly used as a remedy in diarrhœa,
and may be given either in a bolus or diffused in some
distilled water.

DOSE.—From a scruple to two drachms.

ELECTUARY OF SCAMMONY.

Take of Scammony, in powder, an ounce and a half,
Cloves, bruised,

Powder of Ginger, of each six drachms,

Oil of Caraway, half a drachm,

Syrup of Roses, a sufficient quantity.

Drop the syrup on the powders, then add the oil of
Caraway, and mix all together.

REMARKS.—The formula for this electuary has been
altered from that of the former edition, and is now made
to coincide with the formula of the London College.
The quantity of syrup required to make the mass of a
proper consistence at first, is about four ounces and a
half, but when the electuary has been some days made,
it gets quite too solid for use, and will require about

three additional ounces of syrup to make it of a proper consistence, so that in the first instance, every five grains, and afterwards every seven grains of the electuary, contain a grain of scammony.

MEDICAL PROPERTIES AND USES.—It is a warm and active purgative, generally given either in the form of a bolus, or diffused in a purgative draught.

DOSE.—From one scruple to two.

ELECTUARY OF SENNA.

Take of Senna Leaves, reduced to very fine powder,
four ounces.

Pulp of Prunes, a pound,

Pulp of Tamarinds, two ounces,

Treacle, a pint and a half,

Essential Oil of Caraway, two drachms.

Boil the pulps in the syrup to the thickness of honey, then add the powder, and when the mixture has grown cold, add the oil; lastly, mix all well together.

REMARKS.—This is nearly the composition of the old *Electuarium Lenitivum*. The formula of this Pharmacopœia is much more simple and less expensive than that of either the London or Edinburgh College.

MEDICAL PROPERTIES AND USES.—It is a convenient and agreeable mild purgative; but rather apt to gripe when given alone.

DOSE.—One drachm to four.

OINTMENTS AND PLASTERS.

The calamine used in forming ointments should be prepared in the same manner as chalk.

In the composition of ointments and plasters, the wax, resinous and fatty matters should be melted with a medium heat: then being removed from the fire, let them be constantly stirred, until on cooling they are becoming stiff, sprinkling in at the same time the dry substances, if any such are to be used, having previously reduced them to a very fine powder.

PREPARED HOG'S LARD.

Having cut fresh lard into small pieces, melt it with a medium heat, and strain it by pressing it through a linen cloth: the lard prepared by those who sell it, and which is preserved with salt, ought to be melted in twice its weight of boiling water, stirring the mixture constantly; then set it aside, and when it is cold separate the lard:

PREPARED MUTTON SUET

Is prepared in the same manner.

REMARKS.—The object of these processes is to free the fat from the membranous fibres intermixed with it, and from the salt which is added by those who keep lard for sale; care should be taken in the liquefaction not to exceed the prescribed temperature between 100° and 200° Fahrenheit, as too high a heat will give the fat a brown colour and empyreumatic smell.

This operation may be best done in an earthenware vessel, immersed in another containing water of the proper heat.

It appears that the freshness of the lard employed in the formation of certain ointments is a matter of some

consequence, as M. Gallard observed that the colour of some ointments was completely changed when fat was used which had been long kept, and it is well known that eruptions are produced by the use of ointments made with rancid fat.

NITRIC ACID OINTMENT.

Take of Olive Oil, a pound,
Prepared Hogs Lard, four ounces,
Nitric Acid, *by measure*, five drachms and a half.

Having melted the oil and lard in a glass vessel, when they are beginning to become concrete add the acid: then stir them constantly with a glass rod until they become firm.

REMARKS.—In this process the acid is partially decomposed, and part of it is combined with the lard; nitrous gas is evolved; the lard is oxidized and becomes of a yellow colour and firm consistence. It is said to have been invented by Aylon.

MEDICAL PROPERTIES AND USES.—It is a stimulant application, and is used in cutaneous affections, and in ulcers of a syphilitic and herpetic kind. Guibourt thinks it much more efficacious when recently prepared, owing to its retaining some of the nitric acid.

SULPHURIC ACID OINTMENT.

Take of Sulphuric Acid, a drachm,
Prepared Hogs Lard, an ounce.
Mix.

REMARKS.—This ointment is now introduced for the first time, and is peculiar to this Pharmacopœia.

When the lard and acid are mixed as directed in this formula, the only appreciable change that appears to result is a change of colour in the mixture; it becomes of a light buff colour, which afterwards becomes darker until it is as nearly of the colour of the unguentum calaminæ or *Turner's cerate*.

The ingredients ought to be mixed by rubbing them together in a glass or earthenware mortar; if rubbed or mixed with a knife or iron spatula, the colour of the ointment is changed to a darker shade.

The common mode of mixing this ointment on a marble slab is very objectionable, owing to the action of the acid on the lime.

MEDICAL PROPERTIES AND USES.—It is stimulant, and is said to be useful in scabies.

CALAMINE OINTMENT.

Take of the Ointment of Yellow Wax, five pounds,
Prepared Impure Carbonate of Zinc, dried,
a pound.

Rub the carbonate of zinc so that it may be completely powdered; then add it to the ointment of yellow wax, and mix them together.

REMARKS.—This is generally known by the name of *Turner's cerate*.

MEDICAL PROPERTIES AND USES.—It is a good epulotic, and is used as an application to excoriated surfaces, to burns after the inflammation has subsided, and to irritable sores, and sometimes to the eye lids in ophthalmia tarsi.

OINTMENT OF SPANISH FLIES.

Take of Spanish Flies, reduced to a very fine powder,
two ounces,
Distilled Water, *by measure*, eight ounces.
Ointment of White Resin, eight ounces.

Boil the water with the flies down to one half, and strain: mix the cerate with the strained liquor, then evaporate the mixture to a proper consistence.

REMARKS.—This formula has been altered from that of the former edition, in which the powdered flies were ordered to be mixed at once with the ointment without the use of water; the formula, as it stands at present, is intended as a copy from the London Pharmacopœia, but it is in one respect, slightly inaccurate, for in the first part of the directions the preparation of resin is called *unguentum*, and in the latter part *ceratum*, which class of compositions are not included in this Pharmacopœia.

In the *Specimen Pharmacopœiæ* of 1794, a formula very nearly coinciding with the present was given, for which another was however substituted in the edition of 1807.

The experiments of M. Robiquet have shewn, that the matter extracted from cantharides by boiling, possesses a considerable degree of vesicating power,* and when prepared in the form of ointment, supplies us with a very convenient irritating application.

After the evaporation of the decoction, it is difficult to incorporate the residuum with the ointment, which can only be accomplished by keeping them melting together at a low temperature, and continually stirring them until they have cooled sufficiently to be of

* Annales de Chimie, tom. lxxvi. p. 302.

such a consistence, as will prevent separation taking place. Dr. A. T. Thomson informs us, that Galen employed an ointment made by macerating the entire insect in melted lard for twenty-four hours, and then straining by expression.

MEDICAL PROPERTIES AND USES.—This ointment is a milder irritant than that made by mixing the powdered flies with the lard, and is used for keeping up a discharge from a blistered surface, or as an issue ointment; a good stimulating liniment may be made by melting one part of this with half a part of camphor in powder, and three parts of turpentine.

OINTMENT OF WHITE WAX.

Take of White Wax, a pound,
Prepared Hogs Lard, four pounds.

Make an ointment.

REMARKS.—Where no particular directions are given for the mode of making an ointment, as in this formula, the general rule at the commencement of the section is to be followed, see p. 556.

This is the ointment so generally known by the name simple cerate, or simple dressing.

OINTMENT OF YELLOW WAX

Is made in the same manner, except that yellow wax is employed.

REMARKS.—See the last preparation.

SPERMACETI OINTMENT.

Take of White Wax, half a pound,
Spermaceti, a pound,
Prepared Hogs Lard, three pounds.

Melt them, and while they are growing stiff stir them with a wooden rod.

REMARKS.—This is a mild and useful dressing for blistered surfaces or excoriations: it is also a convenient basis for more active combinations.

OINTMENT OF HEMLOCK.

Take of the fresh Leaves of Hemlock,
Prepared Hogs Lard, of each two pounds.

Boil the leaves in the lard until they become crisp, then express through linen.

REMARKS.—This ointment is now introduced into this Pharmacopœia for the first time, and does not appear in those of London or Edinburgh. A substitute for it is often extemporaneously made by blending the powder of hemlock or the extract, which is preferable, with lard or simple cerate.

MEDICAL PROPERTIES AND USES.—It is used as a sedative and anodyne application to foul, cancerous, and irritable sores.

OINTMENT OF VERDIGRIS.

Take of Prepared Verdigris, half an ounce,
Olive Oil, an ounce,
Ointment of White Resin, a pound.

Rub the Verdigris with the oil, then add them to the ointment of white resin previously melted, and mix.

REMARKS.—This is the *Unguentum Æruginis* of the former edition, some oil being now added. For the process for preparing the verdigris, see p. 236.

MEDICAL PROPERTIES AND USES.—It is escharotic and detergent, and used as an occasional dressing to foul, flabby ulcers. It has been found an useful application in ophthalmia tarsi connected with scrofula, for which purpose it ought to be diluted by the addition of some simple cerate: According to Mr. Wilson, it is the only remedy which is capable of curing the obstinate and malignant variety of ring-worm, said to have been imported from the East Indies. It is used also as an application to corns.

OINTMENT OF ELEMI.

Take of Elemi Resin, a pound,
White Wax, half a pound,
Prepared Hogs Lard, four pounds.

Make an ointment, which, while yet hot, should be strained through a sieve.

REMARKS.—The elemi resin is produced by different trees of the family of the *Terebintaceæ*, which belong to the genera *Amyris* and *Icica*, which are natives of Mexico and South America. The *Amyris elemifera* L, to which M. De Candolle refers his *Amyris Plumieri*, was supposed to furnish this resin most abundantly, but at present it is believed that the elemi most abundant in commerce is obtained by incisions from the *icica icicariba* of De Candolle.—*Guillemin. Dict. de Drogues, Simp. et Comp. &c. tom. iv. p. 406.*

Dr. A. T. Thomson says, there is no true elemi to be found in the shops.

MEDICAL PROPERTIES AND USES.—It is stimulant and digestive, and is applied to indolent ulcers, and sometimes to keep open setons and issues. This ointment, with the addition of some turpentine as in the London formula, is much used in our surgical hospitals under the name of warm dressing.

OINTMENT OF GALLS.

Take of Galls, reduced to very fine powder, an ounce,
Prepared Hogs Lard, eight ounces.

Mix so as to form an ointment.

REMARKS.—This ointment is now introduced for the first time from the Edinburgh Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is astringent, and in combination with zinc ointment, is applied with advantage to piles, after the inflammatory stage has passed. The following formula has been found very serviceable in such cases.

℞ Pulveris Gallarum ʒi.
Camphoræ ʒss.
Tinct. opii ʒii.
Unguenti Cetacei ʒi.—Misce.

To be applied at night.

MERCURIAL OINTMENT.

Take of Purified Mercury,
Prepared Hogs Lard, of each an equal
weight.

Rub them together in a marble or iron mortar, till the globules of mercury disappear.

MILDER MERCURIAL OINTMENT

Is made with double the weight of lard.

REMARKS.—It may be observed in the first place, that this ointment is seldom made by the apothecary in this country, that found in the shops being very generally manufactured by machinery. And according to Chereau and Robiquet, the ointment prepared in an iron mortar, discolours and stains the skin of the patient using it.

The extinction of the metal requiring much time, a great variety of expedients have been resorted to for the purpose of facilitating this operation, such as the use of rancid lard, turpentine, &c., but such additions render the ointment irritating, and its use immediately produces a very troublesome eruption on the skin, which prevents a continuance of its application.

Sulphur is found to abridge very considerably the labour requisite for the extinction of the mercury, hence sulphureted oil is not unfrequently added to the lard, but it converts a portion of the metal into a sulphuret, and diminishes the power of the ointment. Another method of facilitating the process, not apparently liable to objection, though the theory of its operation is obscure, consists in adding to the ingredients a portion of old mercurial ointment, which appears to act as a leaven to the whole mass.

Guibourt made some experiments to compare its extinction by means of egg-oil, oil of sweet almonds, and mercurial ointment, instead of fresh lard. He found that egg-oil possessed no superiority over lard, that oil

of sweet almonds facilitated its extinction somewhat, and mercurial ointment very much.

He recommends the mercury to be triturated first with one-sixteenth of old mercurial ointment, and then with the necessary proportion of lard.

M. Simonin has also made some observations on the subject, the most important of which is, that fresh lard which either could not extinguish mercury, or only after very long trituration, did it in the course of a few minutes, after having been spread over an earthenware plate, so as to expose a large surface, and placed for fifteen days in a cellar not too moist, whose temperature was 50 Fahrenheit. Without being rancid, it had undergone a modification not as yet appreciated.—*Journal de Pharm.* tom. xiv. p. 285.

In the same volume of the *Journal de Pharmacie*, p. 360, Chevallier maintains the merit of a process of his own, which he had long used with great success. Eight ounces of mercury were put into a bottle, and four ounces of melted lard poured upon it. They were then shaken together until the lard began to cool, and had acquired the consistence of a very thick syrup. It was poured out into an earthenware mortar, and stirred continually with a bistortier for ten minutes; four ounces more of lard were added, and the trituration continued. In half an hour the ointment was perfectly prepared.

The state in which the mercury exists in this ointment, is by no means agreed on, some maintaining its existence in a state of mere mechanical division, while others, with more reason, assert its partial conversion into protoxide. Numerous experiments have been made by the assertors of each of these opinions, in support of their particular views of the question, the detail of which would extend to a length quite unsuited to these remarks. I shall therefore confine myself to the mention of M. Roux's experiments, and those of Mr. Donovan of this city.

Roux, in a letter to M. Planche, states that he was almost confirmed in his opinion of the mere mechanical division of the mercury, by employing for the extinction of the mineral, various substances which evidently answered the purpose in the direct ratio of their tenacity; but desirous of settling the question, he made the following experiment:

He put a quantity of maltha, a substance not calculated to communicate oxygen to the mercury, reduced to the consistence of a syrup, and a portion of mercury, into a mortar, which he placed under the receiver of an air pump, in which he was enabled to rub the materials by means of a piece of machinery attached to the pestle. Having exhausted the receiver, the mercury was extinguished as completely as if the operation had been performed in the air.—*Journal de Pharm. Mai. 1825.*

Mr. Donovan melted at 212° four ounces of common mercurial ointment prepared by machinery: it separated into two strata. When cold, the upper stratum, which was of a light grey colour, was separated, and the under stratum was heated in contact with blotting paper which soaked up the lard. The very heavy residue triturated with a little magnesia, almost instantly afforded 495 grains of mercury, and by subsequent trituration with the magnesia 225 grains more; the earthy mass, by a variety of processes afforded 60 grains more, and a little oxide also appeared: so that out of 960 grains of mercury which the four ounces of ointment originally contained, there were recovered 770, leaving 190 grains, the quantity of mercury apparently oxidized, or $47\frac{1}{2}$ to each ounce.*

* There is an inaccuracy in this calculation, as the sum of the grains of mercury recovered amounts to 780, consequently the quantity of oxide ought to be 180 grains instead of 190. Giving a proportion of 45 grains to each ounce of ointment instead of $47\frac{1}{2}$.

There seems reason to suspect, that the operation of melting the ointment at 212° in this experiment, may have had some effect in reducing a greater quantity of the mercury to the metallic state, than had previously existed in that condition.

Hence however it appeared evidently, that the mercury exists in the ointment in two very different conditions, *mechanically divided*, as asserted by Vogel, Roux, Planche, and others, and in the state of *oxide chemically combined* with the lard, as in the upper stratum: he also found, that the medicinal activity of the ointment resided almost exclusively in the latter portion.

These results suggested to him the idea of forming the ointment by a direct combination of lard and protoxide of mercury, which he did by keeping lard and the oxide of mercury at a temperature of about 350° for two hours, continually stirring them. At the end of the process it appeared, that every ounce of lard had dissolved and combined with 21 grains of oxide.

From the trials made with this ointment, it appears to be fully as efficient as the officinal preparation: and to possess the advantage of being capable of introduction by inunction in one-third of the time generally required, and of being much less expensive.—*Annals of Philosophy*, vol. xiv. p. 327.

MEDICAL PROPERTIES AND USES.—The mercurial ointment is very extensively used for the purpose of introducing mercury into the system by external friction, in order to produce its specific effects, particularly in venereal affections, diseases of the liver, acute inflammations, and dropsy of different kinds. Applied in this form, it exerts its full influence on the system, without producing the disturbance of the bowels which so constantly attends the administration of mercury by the mouth.

From half a drachm to a drachm of the ointment is

rubbed on the inside of the thigh, leg, or arm, every night and morning; till its peculiar effect is produced, and it is better to rub only one thigh at a time, as the operation is apt to bring out on the part rubbed a very painful eruption, which prevents a repetition of the friction on the same part: the parts of the body above mentioned, are chosen on account of the thinness of the cuticle, and the great number and size of the absorbents which lie near the surface; the friction should be performed by the patient, and continued till the ointment is all rubbed in, which generally takes about half an hour to accomplish completely; when the part gets dry before the friction is fully finished, a few drops of camphorated oil poured on the hand will greatly facilitate the completion of the friction. The ointment prepared according to Mr. Donovan's process, may be rubbed in in a much shorter time, seldom requiring more than twelve minutes, besides which it brings out no eruption where it is rubbed, and leaves no stain upon the patient's skin or linen.

The weaker ointment is only used as a dressing to venereal sores.

OINTMENT OF NITRIC OXIDE OF MERCURY.

Take of the Nitric Oxide of Mercury, an ounce,
White Wax, two ounces,
Prepared Hogs Lard, six ounces.

Having melted the lard and wax together, add the nitric oxide of mercury reduced to the finest powder, and mix them well together.

REMARKS.—The characters and properties of the nitric oxide of mercury, are detailed at p. 269, et seq. for the preparation of this ointment, care should be taken

to reduce it to the finest powder as above directed. It is useful to know, says Dr. Duncan, that if it be mixed with any ointment containing resin, the *red* oxide is very quickly converted into the *black*, and the ointment gradually loses its red colour, and passes through olive green to black.

This ointment ought to be prepared only when wanted, or at least ought not to be long kept, as it changes its colour from red to grey, owing probably to a partial decomposition of the oxide of mercury.

MEDICAL PROPERTIES AND USES.—It is a good stimulant application to ill-conditioned indolent sores. It is also very useful in inflammations of the conjunctiva, and more particularly where there is thickening of the lining membrane of the palpebræ, and for the removal of specks from the cornea; for these purposes it requires to be diluted with simple cerate or lard. It is popularly known by the name of *Red precipitate ointment*.

OINTMENT OF AMMONIATED SUBMURIATE OF MERCURY.

Take of Ammoniated Submuriate of Mercury, a
drachm,

Prepared Hogs Lard, an ounce and a half.

Having melted the lard, and allowed it to begin to cool, add the submuriate of mercury and mix them well.

REMARKS.—The preparation of the ammoniated submuriate of mercury has been already described, and its characters and properties explained at p. 290, et seq.

This is the *unguentum præcipitati albi* of the London Pharmacopœia, and is popularly known by the name of *White Precipitate Ointment*.

MEDICAL PROPERTIES AND USES.—This ointment is useful in the treatment of herpetic and other obstinate cutaneous eruptions. It has been recommended by Werlhoff and others as a remedy for the itch: diluted with twice its weight of pomatum, it is employed for the cure of porrigo.

OINTMENT OF THE NITRATE OF MERCURY, OR
CITRINE OINTMENT.

Take of Purified Mercury, *by weight*, an ounce,
Nitric Acid, eleven drachms and a half,
Olive Oil, a pint,
Prepared Hogs Lard, four ounces.

Dissolve the mercury in the acid, then having melted the oil and lard together, mix them and make an ointment in the same manner as the ointment of nitric acid.

REMARKS.—The ointment prepared according to this formula, in which the quantity of acid used has been diminished from 16 drachms to $11\frac{1}{2}$, is liable to the objection of undergoing very marked changes both of colour and consistence, even when but a short time kept: its colour changes to a slate grey, and it becomes hard, brittle, and almost pulverizable. This change of consistence is attributed by Dr. A. T. Thomson to the quantity of lard used, which he says is six times too great, while as Dr. Duncan observes, it has been more generally referred to the excess of acid necessary for dissolving the mercury, hyperoxidizing the fatty substances: but facts render the truth of either of these opinions very doubtful.

Much has been supposed to depend on the nature of the unctuous matter employed, and it has been said, that

the superiority of the secret preparation called *Golden Eye Ointment*, is owing to the use of unsalted butter: but I am informed, that if this ointment be so prepared, it is found to be too corrosive.

The preparation of this ointment has much engaged the attention of pharmacutists, and from an idea of the injury resulting from an excess of acid, the object has been to reduce the quantity of it; but this appears a mistake, for Dr. Duncan informs us, that the most perfect ointment he ever saw, and in no respect inferior to the secret preparation, was made by Mr. Duncan, a very skilful apothecary in Edinburgh, by the following process: Take of nitrous acid 12 ounces, mercury 4 ounces, olive oil $26\frac{1}{2}$ ounces, axunge 15 ounces: dissolve the mercury in the acid, and pour the solution while hot into the lard melted in the oil, and still hot, and mix in a vessel capable of containing five times the quantity, as a violent effervescence takes place. If it should not froth up, the action must be assisted by heat.

Mr. Duncan found, that the ointment could not be diluted without altering its properties.

The difference between this and the officinal formulæ, is the much larger proportion of acid employed, and the higher temperature applied at the time of the mixture of the mercurial solution with the oily substances. The violent effervescence, says Dr. Duncan, probably arises from the disengagement of nitric oxide, and it would appear that the rapid oxygenizement did not harden the oily substances so much as a slower change, and that a higher oxygenizement of the nitrate of mercury prevented its decomposition and gradual conversion into the state of protoxide, on which the slate colour of the officinal ointment, when long kept, probably depends."— See *Duncan's Supplement*, pp. 195-6.

The constitution of this ointment is not yet well understood. It is regarded, when recent, as a compound of

oxygenated fat, with interposed supernitrate of mercury. The nitric acid of the nitrate of mercury yields a part of its oxygen to the fat which passes to the state of oxygenated fat, and another part of the oxygen of the acid is combined with the carbon and hydrogen of the fat, and is converted into water and carbonic acid.

It is certain that the ointment is very different if the nitro-mercurial solution has been mixed hot, or if it has been mixed cold. In the first case, the preparation has a fine deep yellow colour, which it preserves for a long time, both on the surface and in the center without sensible alteration. It is supposed that the nitrate of mercury is then decomposed. In the second case, the ointment changes colour, tarnishes, and becomes brittle. *Chereau and Robiquet.*

MEDICAL PROPERTIES AND USES.—This ointment is stimulant and detergent; diluted with simple lard or spermaceti ointment, it is an application of great efficacy in herpetic eruptions, psoriasis, porrigo, and other cutaneous affections. It is almost a specific in psorophthalmia, and in those slight excoriations of the tarsi attended with extreme itching: it may be most conveniently and effectually applied by rubbing a piece of the size of half a garden pea with a camel hair pencil over the tarsi, among the roots of the ciliæ, and allowing a small quantity to get on the inner membrane of the palpebræ. In obstinate cases, a weak solution of muriate of mercury used as a collyrium along with this ointment, has been found a powerful remedy. Baumé recommends it to be rubbed to the extent of two drachms upon the legs and wrist for nine days, for the cure of scabies; and says it sometimes excites salivation; united with equal parts of the ointment of oxide of zinc it is a useful application to chopped nipples.

OINTMENT OF IODINE.

Take of Iodine, a scruple,
Prepared Hog's Lard, an ounce.

Rub them together so as to form an ointment.

REMARKS.—Iodine is now, for the first time, introduced into this Pharmacopœia, and has not as yet been ordered by the London or Edinburgh College.

This ointment has a rich orange brown colour, which changes and grows pale on the surface if the ointment is kept, which, however, is seldom the case, being almost always extemporaneously prepared.

IODINE, the active matter of this preparation, was first discovered by M. Courtois, a manufacturer of saltpetre in Paris, and soon occupied the attention of several chemists. It was found to exist in several varieties of the fuci, in the *Ulva umbilicalis*, *pavonia*, and *linza*, in sponge, (see p. 542,) and, according to Chevallier, it is found in the coverings of the ova of the sepia: it exists in these substances in the form of an hydriodate, and according to Gaultier de Claubry, is afforded in the greatest quantity by the *fucus saccharinus*, in the form of hydriodate of potash.

In this country iodine was examined particularly by Sir H. Davy and Dr. Wollaston, the latter of whom pointed out the following process for preparing it:

Digest kelp in water until all the soluble matter is taken up, then filter the solution and evaporate it, in order to separate all the salts of soda contained in it. To the mother water add cautiously sulphuric acid in excess, then boil for some time and leave it at rest: decant off the clear liquor, introduce it into a glass retort, and add as much of the black oxide of manganese as there has been sulphuric acid employed: connect the

retort with a receiver, and apply heat, when the iodine will come over in beautiful violet coloured* vapours, which condense in the neck of the retort and in the receiver, in the form of blackish or bluish grey scales:

The salt obtained by the evaporation of soap makers' ley, treated in the same manner, will afford iodine in larger quantity.

The iodine ought afterwards to be purified by introducing it into a retort with a little water, and $\frac{1}{500}$ th part of potash: then distilling it in a sand bath, and condensing the vapours in a large receiver kept cold; lastly, drying the iodine by pressing it between folds of bibulous paper. It should be kept in bottles fitted with glass stoppers.

PROPERTIES AND TESTS OF ITS PURITY.—Iodine is procured in the form of scales, of blackish or bluish grey colour and metallic lustre, and has a peculiar smell somewhat resembling *chlorine*. Its fracture is lamellated, and it is soft and friable to the touch, giving a deep brown colour to the skin, which soon disappears. It has been obtained in elongated octohedrons, nearly half an inch in length, the axes of which were shewn by Dr. Wollaston to be to each other as 2, 3, and 4. Its specific gravity is 4.946. It dissolves in 7000 parts of water, melts at 225 Fahrenheit, and volatilizes at about 315°, giving off a beautiful violet coloured vapour, the specific gravity of which is 8,695, according to Thenard. It unites with several simple bodies, forming compounds that are called *iodides*: with oxygen it forms *iodic acid*, and with hydrogen *hydriodic acid*. It is a very delicate test for the presence of starch. See remarks on the extract of elaterium, p. 511; and according to Gaultier de Claubry, starch will detect iodine in solutions, in which the proportion of the iodine does not exceed

* Hence its name, from *ιωδης violaceus*.

$\frac{1}{450000}$ of the liquid; the effect produced being the production of a fine blue colour.

Iodine is occasionally adulterated with oxide of manganese and charcoal: to detect this fraud, M. Robiquet directs us to submit 100 parts of the suspected substance to sublimation, and to weigh the residuum: or the method of Chevallier may be adopted, which consists in treating it with alcohol, which will dissolve the iodine and leave the oxide of manganese and the charcoal behind. The iodine of commerce is frequently very humid, containing 12 parts of water in 100, which should be separated before making the tincture.

MEDICAL PROPERTIES AND USES.—Iodine was first introduced into practice by Dr. Coindet, of Geneva, who, from observing that burnt sponge formed the basis of all the remedies that had been used with success in the treatment of goitre, was led to the conclusion that the iodine contained in the burnt sponge was the efficient remedy; he accordingly employed preparations of iodine in the treatment of goitre, and with success. His observations, which have since been confirmed by others, appear to prove that the action of this substance is especially directed to the thyroid, as that of mercury is to the salivary glands.

The administration of iodine, thus introduced, was soon extended to other diseases, in which the object was to excite powerfully the absorbents, an effect which this remedy has been found to produce in a remarkable degree: hence it has been much used for the removal of glandular enlargements, as bronchocele, swelled testicle, enlargements of the liver, spleen, uterus, &c.; on the same principle it has been tried, and with great success, for the cure of ascites, particularly by Dr. Baron, of Gloucester, and some cases have been recently published in which it appears to have been productive of great benefit in ovarian dropsy.

It is also said to have cured some cases of chorea, after arsenic and carbonate of iron had failed.

Of its effects in cases of schirrous and other enlargements of the uterus, as well as in cancer of that organ, I must speak most doubtingly. I have had several opportunities of trying its effects in these cases, and in one instance only was it productive of any benefit, and that only for a time : in most of my cases it so deranged the stomach, and system generally, that its use could not be persevered in, and even where this did not happen, the remedy did no good ; in no instance however, did it give rise to uterine hæmorrhage, an effect which is apprehended from its use. As to its emmenagogue powers I am unable to speak, not having tried it for such a purpose, but I am informed by those who have used it with this intention, that its claim to any such influence is very doubtful.

Iodine has been much used in scrofula, and it is said with much advantage ; but so far as my experience has enabled me to judge, very little reliance can be placed on its efficacy in that affection.

It should be recollected, that when iodine is used, it enters the circulation, and affects the whole absorbent system, so that during its operation for diminishing morbidly enlarged glands, the healthy glands are also liable to be affected by its action, a circumstance which has occasionally given rise to unpleasant consequences ; the *mammæ* and the testicles being, in some instances, the parts so reduced.

Dr. A. T. Thompson says there is reason to suppose that iodine is not decomposed in its passage through the system, as he detected it in the urine of a patient who was taking the tincture of iodine to the extent of thirty drops twice a day, but in some experiments made on dogs for the purpose, although he found it in the urine he could not detect the least trace of it in the chyle.

The continued use of iodine is sometimes productive of great derangement in the system, occasioning reduction of strength, pains of the stomach and bowels, nausea, purging, headach, vertigo, and disturbance of the nervous system resembling paralysis agitans, and accompanied with distressing palpitations. When these symptoms begin to shew themselves, its use should be either intermitted or relinquished altogether.

Iodine is administered in a great variety of forms, in substance, in doses of half a grain to a grain; in tincture; in the form of salt, as hydriodate of potash and iodide of mercury, the latter having been used by Biett with great advantage in syphilitic enlargement of ganglions: externally it is used in the form of ointment, as in the preparation above ordered, or the ointment of hydriodate of potash, or of iodate of zinc, and also, as a liniment consisting of one part tincture of iodine and from four to eight parts soap liniment.

TAR OINTMENT.

Take of Tar,

Mutton Suet, of each half a pound,

Melt them together and strain through a sieve.

MEDICAL PROPERTIES AND USES.—This ointment is sometimes applied as a stimulant to foul ulcers, and has been found useful in some cutaneous affections, particularly tinea capitis: it derives its power from the empyreumatic oil and pyroligneous acid contained in the tar.

OINTMENT OF BLACK PEPPER.

Take of Prepared Hog's Lard, a pound,
Black Pepper, reduced to powder, four ounces.

Make an ointment.

REMARKS.—This ointment is not ordered by either the London or Edinburgh College.

MEDICAL PROPERTIES AND USES.—It is obviously a very stimulating and irritating compound.

“As a medicament pepper, and particularly black pepper, is a substance eminently active, and even irritating. Reduced to powder, and applied on the skin in the form of a wet paste, it heats and reddens the part; and if the application be continued sufficiently long, it brings out a crop of phlyctenæ of different sizes. It acts then exactly like the meal of mustard seed, and with much greater activity.”—Richard, *Dict. de Med.* tom. 17, p. 307.

This ointment was formerly in vogue as a cure for tinea capitis, and the powder of black pepper still remains an ingredient in the French *onguent pour la gale*.

OINTMENT OF ACETATE OF LEAD.

Take of Ointment of White Wax, a pound and a half,
Acetate of Lead, an ounce.

Make an ointment.

REMARKS.—The preparations of lead have been considered as possessing a specific power in abating inflammation by local application, for which purpose they are usually applied in the form of solution, but where that

of ointment is preferred, this composition has been regarded as preferable to any other; it is the *ceratum acet. plumbi* of the London Pharmacopœia: for the preparation of the acetate of lead, and its properties, &c. see p. 300, et seq.

MEDICAL PROPERTIES AND USES.—It is a soothing application to excoriated surfaces, and allays the pain of inflamed parts. It was formerly applied to the eyelids in ophthalmia tarsi, but the solution is preferable for this purpose.

OINTMENT OF CARBONATE OF LEAD.

Take of Carbonate of Lead, reduced to very fine powder, two ounces,

Ointment of White Wax, a pound.

Make an ointment.

REMARKS.—In the former edition of this Pharmacopœia, this ointment was called *Unguentum subacetatis plumbi*, the salt of lead being then supposed to be a subacetate.

MEDICAL PROPERTIES AND USES.—It is a useful cooling desiccative for excoriated surfaces. A plaster containing the carbonate of lead is said to have produced much benefit in neuralgia, when kept constantly applied over the seat of the pain.

OINTMENT OF THE HYDRIODATE OF POTASH.

Take of the Hydriodate of Potash, a scruple,

Prepared Hog's Lard, an ounce,

Rub them together and form an ointment.

REMARKS.—The peculiar characters and properties of the hydriodate of potash are detailed in the remarks subjoined to the formula for its preparation.

When this ointment is made, as it ought to be, with fresh lard, it is very white; but if the lard be rancid, the composition is yellow, and the shade of colour is deep in proportion to the staleness of the lard. This subject has been investigated by M. Gallard, and the change of colour is attributed to some iodine which is set at liberty, a circumstance which has been accounted for by supposing that the lard becoming oxygenized, is in a state fit to impart oxygen to the hydriodic acid, which uniting with its hydrogen forms water, while a portion of the iodine is set at liberty and communicates its colour to the ointment.

MEDICAL PROPERTIES AND USES.—Like the other preparations of iodine, it is used to procure the absorption of glandular enlargements and of dropsical fluids, from half a drachm to a drachm being rubbed diligently on the part. Magendie observes, that occasionally after the first rubbing with this ointment, the swelling, instead of becoming softer, grows harder, and becomes slightly painful; this local irritation may, in general, be removed by a few leeches, after which the iodine will take effect with energy.

The activity of this ointment may be increased by adding from ten to fifteen grains of pure iodine, to form what is called *Ointment of Ioduretted Hydriodate of Potash*.

Dr. Ure recommends the following formula as a substitute in some cases for the foregoing:

Take of Iodate of Zinc, a drachm,

Lard, an ounce, Mix.

A drachm may be rubbed at a time.

OINTMENT OF WHITE RESIN.

Take of Yellow Wax, a pound,
White Resin, two pounds,
Prepared Hog's Lard, four pounds.

Make an ointment, which, while yet hot, should be strained through a sieve.

REMARKS.—This is nearly the composition of the old *unguentum basilicum*.

MEDICAL PROPERTIES AND USES.—It is stimulant and digestive, and is used where the object is to promote suppuration.

SAVINE OINTMENT.

Take of the fresh Leaves of Savine, stripped from their stalks and bruised, half a pound,
Prepared Hog's Lard, two pounds,
Yellow Wax, half a pound.

Boil the leaves in the lard until they become crisp, then strain by expression; lastly, add the wax, and melt all together.

REMARKS.—This ointment, prepared according to the above formula, is of a fine green colour; which is sometimes imitated by sap green, while the peculiar odour of the savine is obtained by mixing some of the essential oil with the spurious preparation: it seems reasonable to suppose that a very good mode of preparing this ointment would be, to add the expressed juice of the leaves to the melted lard and wax, as the properties of the plant can hardly escape being

injured by such long exposure to a high temperature, as that ordered in the formula.

If prepared, as is sometimes done, by using the powder of the leaves, it is intolerably acrid: such an ointment may be known by its being opaque and gritty, not smooth.

MEDICAL PROPERTIES AND USES.—Savine ointment is well calculated for keeping up the discharge from a blistered surface, which it does in general with less irritation than the ointment of cantharides, especially when the latter is prepared with the powdered flies.

ELDER OINTMENT.

Take of the fresh Leaves of Elder, three pounds,
Prepared Hog's Lard, four pounds,
Prepared Mutton Suet, two pounds.

Make an ointment in the same manner as the Savine Ointment.

REMARKS.—In the former edition of this Pharmacopœia, and in the present one of London, this ointment is directed to be made with the elder *flowers*, in which state it is nothing more than a scented pomatum of a whitish colour: the present preparation is inodorous, and of a greenish hue, but I am not aware of any advantage obtained by the change made in the formula.

OINTMENT OF SCROPHULARIA.

Take of the fresh Leaves of the knotty rooted Figwort,
Prepared Hog's Lard, of each two pounds,
Prepared Mutton Suet, a pound.

Boil the leaves in the fat until they become crisp, then strain by expression.

REMARKS.—This ointment is now introduced into this Pharmacopœia for the first time, and does not appear in those of Edinburgh or London.

MEDICAL PROPERTIES AND USES.—The virtues of this ointment were first brought into notice here by Dr. Whitley Stokes, on account of its great efficacy in curing a malignant disease to which children are liable, generally called “burnt holes,” and for which Dr. Stokes proposed the name of *Pemphigus gangrenosus*, in the cure of which complaint it has been found to act almost as a specific. For a full description of the disease and the method of cure, see Dr. Stokes’ paper in the Dublin Medical Essays, p. 146. It has been found useful in tinea capitis, impetigo, and several other cutaneous affections.

SULPHUR OINTMENT.

Take of Prepared Hog’s Lard, four pounds,
Sublimed Sulphur, a pound,

Rub the sulphur into fine powder and mix it with the lard.

REMARKS.—There is reason to believe that chemical union, to a certain extent, takes place between the sulphur and the lard in preparing this ointment.

MEDICAL PROPERTIES AND USES.—This ointment is well known as a specific in the itch, but the smell produced by its use is so intolerable, that several substitutes have been proposed in order to obviate the inconvenience. Dr. Bateman recommends the following:

Take of Carbonate of Potash ʒss .

Rose Water, ʒi .

Red Sulphuret of Mercury, ʒi .

Essential Oil of Bergamot, ʒss .

Sublimed Sulphur and Hog's Lard, of each ʒix .

Mix.*

The disease may be very effectually cured by friction with a solution of muriate of mercury in water, along with which the use of a bath containing sulphuret of potash may be conjoined with great advantage. The latter means will of itself cure the complaint, but requires too long a time, the cure not being completed in general in less than from three to four weeks. See the observations of Jadelot.—*Dict. de Med.* tom. ix. pp. 548-9.

TARTAR EMETIC OINTMENT.

Take of Tartrate of Antimony and Potash, a drachm,
Prepared Hog's Lard, an ounce.

Reduce the tartar emetic to the finest powder, and mix it with the lard.

REMARKS.—This ointment is now, for the first time, introduced into this Pharmacopœia, and is not ordered by the other colleges. For a very full account of the preparation and properties of tartar emetic, see p. 211, et seq. In general this ointment is made with two drachms of tartar emetic to the ounce of lard.

This ointment is quite white, and from its being devoid of smell is liable to be mistaken for simple ointment, owing to which I once saw a blistered surface

* Synopsis of Cutaneous Diseases, Ed. VI. p. 205. note.

dressed with it: it would therefore be desirable to add to it some colouring matter, as in Jenner's receipt, which was as follows:

℞ Unguenti Cetacei ʒix.
Antim. Tart. ʒii.
Sacch. Albi. ʒi.
Hydrarg. Sulph. Rub. gr. v.—Misce.

According to Dr. Paris, the addition of the white sugar is for the purpose of preventing the ointment becoming rancid; it probably helps to render the division of the tartar emetic more complete, and is supposed to make the ointment more active.

MEDICAL PROPERTIES AND USES.—This ointment is a very useful and active stimulant, and counter irritant. It is used by friction on the skin; from half a drachm to a drachm should be rubbed in once or twice a day, until a crop of pustules is produced, which are very painful, and resemble a variolous eruption.

By this application, says Dr. Jenner, we can not only create vesicles, but we can do more; we have at our command an application which will at the same time both vesicate and produce diseased action on the skin itself, by deeply deranging its structure beneath the surface. This is probably one cause why the sympathetic affection excited by the use of cantharides, and those changes produced by tartar emetic, are very different.

Should the pustules become very much irritated and excessively painful, a soft bread and milk poultice will in general afford relief, without interfering with the progress of the eruption.

In hooping cough, frictions with this ointment upon the region of the stomach have been greatly extolled, and a similar application to the spine has been supposed to be beneficial in the treatment of tetanus. It has been

used with advantage in hydrocephalus, chorea, and epilepsy.

HELLEBORE OINTMENT.

Take of the Root of White Hellebore, reduced to powder, three ounces,
Prepared Hog's Lard, a pound.

Make an ointment.

REMARKS.—This is the *Unguentum hellebori albi* of the former edition.

MEDICAL PROPERTIES AND USES.—This ointment is sometimes used as a substitute for sulphur ointment in the cure of scabies, being free from the disgusting smell produced by sulphur: but is not at all so efficacious or certain; it ought to be cautiously used, and not applied to children.

OINTMENT OF OXIDE OF ZINC.

Take of the Ointment of White Wax, a pound,
Oxide of Zinc, prepared in the same manner as chalk, two ounces.

Melt the ointment, and mix in the oxide in very fine powder.

REMARKS.—For the mode of preparing oxide of zinc, its properties, &c., see p. 310, et seq.

MEDICAL PROPERTIES AND USES.—It is astringent and stimulant, and is used to promote the drying of excoriated and exuding surfaces; it is sometimes applied in chronic inflammation of the eye, accompanied by a relaxed state of the vessels. It has also been found use-

ful in sore nipples, for which it may be combined with Citrine ointment.

PLASTERS.

Plasters are in general solid tenacious compounds, adhesive at the ordinary temperature of the human body, and owing their consistence to different circumstances. 1st, To a due admixture of wax or fatty matter with resin; as in the simple or wax plaster, differing only in *consistence* from ointments and liniments, for which reason Deyeux proposes to distinguish them by the name of solid ointments. 2d, To the chemical combination of the semivitreous oxide of lead with oils or fat, as in the *Litharge plaster*: 3d, To the chemical action of the components of the plaster on each other, as in the *Ammoniac plaster*.

The composition of plasters has been investigated by M. Henry, and the result of his experiments he states to be, that of all fatty matters, olive oil and fat are the best calculated to unite with the metallic oxides; and that amongst the metallic oxides, those of lead are the only ones fit to combine with fatty matter for this purpose: that the protoxide of lead or litharge, is the only one which makes a good plaster, and that the English litharge should be preferred.

Plasters should be of such a consistence, as not to adhere to the hand when cold, they should be easily spread when heated, and remain tenacious and pliant after they are spread, but should not be so soft as to run when heated by the skin: they are apt to become too hard and brittle when long kept; in such case those that are unctuous may be re-melted by a gentle heat, and some oil added to them; those which contain metallic oxides

ought to be melted by means of boiling water, for in a higher temperature the fatty matter is apt to reduce the oxide.

Plasters are employed as local remedies, to answer various indications; sometimes simply as coverings to sores and abraded surfaces, to protect them from the action of the air, or as a mechanical support to the parts; in some instances they contain acrid and stimulating substances, and act as blisters, and sometimes they are made the vehicles of sedative applications.

AMMONIAC PLASTER.

Take of Pure Gum Ammoniac, five ounces,
Vinegar of Squill, half a pint.

Dissolve the ammoniac in the vinegar, then evaporate the liquor by heat, continually stirring it until it is of a proper consistence.

REMARKS.—I suppose the *Vinegar of Squill* is here used as a solvent in preference to simple vinegar or acetic acid, as adding to the stimulating property of the plaster.

MEDICAL PROPERTIES AND USES.—This plaster is stimulant and resolvent: it is applied over indolent tumours and pains in the joints; its stimulating power is sometimes so considerable as to bring out a crop of inflamed papulæ. Dr. Paris mentions that this plaster is a specific for a peculiar disease of the knee, to which servant maids who scour floors upon their knees are liable.

AMMONIAC PLASTER WITH MERCURY.

Take of pure Gum Ammoniac, a pound,
Purified Mercury, three ounces,
Common Turpentine, two drachms.

Rub the mercury with the turpentine until the globules disappear, then by degrees add the ammoniacum melted, and with a medium heat rub them together till they all unite.

REMARKS.—The addition of the mercury, which is partially oxidized by the trituration, renders this plaster more efficacious as a discutient.

MEDICAL PROPERTIES AND USES.—By the continued application of this plaster the mercury is sometimes introduced into the system so as to affect the mouth; it is applied in cases of syphilitic pains in the joints and limbs, nodes, tophi and indurated glands: it is also worn with advantage in chronic enlargement and pain in the liver.

AROMATIC PLASTER.

Take of Frankincense, three ounces,
Yellow Wax, half an ounce,
Cinnamon Bark, powdered, six drachms,
Essential Oil of Jamaica pepper.
Essential Oil of Lemons, of each two
drachms.

Melt the Frankincense and wax together, and strain: when they are beginning to thicken by cooling, mix in the powder of Cinnamon rubbed up with the oils, and make a plaster.

REMARKS.—Owing to the volatile nature of its ingredients this plaster does not keep well; it ought therefore to be extemporaneously prepared, and should be but moderately adhesive to allow of its being frequently renewed without irritating the skin; when spreading, it ought not to be melted, and the slightest degree of warmth, such as that of the fingers, should be applied to avoid the dissipation of some of its volatile constituents.

MEDICAL PROPERTIES AND USES.—It is used as a stimulant, applied over the region of the stomach in dyspepsia and increased irritability of that organ, to allay pain and nausea, and expel flatus.

BELLADONNA PLASTER.

Take of the Inspissated Juice of Belladonna, an ounce,
Soap Plaster, two ounces.

Make a plaster.

REMARKS.—An eligible way of accomplishing the mixture of the ingredients for the formation of this plaster, is to put them into an earthenware mortar, placed in water of the proper temperature. See general rule, p. 556. This plaster is now introduced for the first time into this Pharmacopœia, and is not ordered by the London or Edinburgh College.

The preparation of the inspissated juice of Belladonna, and its properties, have been already detailed at p. 479, et seq.

MEDICAL PROPERTIES AND USES.—This plaster has been found an eligible mode of applying belladonna topically, for the relief of neuralgic and other pains.

PLASTER OF CANTHARIDES.

Take of Cantharides, reduced to very fine powder,
Yellow Wax, of each a pound,
Yellow Resin, four ounces,
Mutton Suet,
Hog's Lard, of each half a pound.

Having melted the wax, fat, and resin together, when they are just becoming stiff by cooling, sprinkle in the cantharides and mix, so as to form a plaster.

REMARKS.—In spreading this plaster, care should be taken to avoid the use of too hot an iron, which will greatly impair the properties of the cantharides: and in fact warming the spatula at all is unnecessary, as the plaster is of such a consistence, that it may be spread without being softened by heat.

MEDICAL PROPERTIES AND USES.—This plaster has been found to act with more certainty and safety than any other substance employed for producing vesications, and is accordingly known generally by the name of *Blistering Plaster*.

It is usually applied spread on a piece of leather, cut to the prescribed size and form, and having its margin covered with adhesive plaster, so that when applied the blister cannot fall off or slip, and change its place, by which very awkward accidents have occurred; if applied where the cuticle is thick, the application of a poultice for an hour, or washing the part with warm vinegar, is a useful preliminary.

The usual time for keeping on a blister is twelve hours or more, which I believe to be in general a very unnecessary delay, as its effect is usually produced within a much shorter time, and its continued application only inflicts unnecessary irritation, or even occasionally gives rise to some very unpleasant consequences, such as de-

struction of the cutis vera, followed by an ugly spreading sore very difficult to heal: this is sometimes painfully illustrated in the cases of children to whom blisters have been applied, and allowed to remain on for ten or twelve hours, or even a much shorter time. Blisters ought never be allowed to remain on young children for more than three, or at most four hours, and should then be removed whether they have risen or not; for the vesication will appear after they have been removed: by a neglect of this, and the application of too large a blister I have seen very grievous accidents occur among children; and the life of one undoubtedly fell a sacrifice to mismanagement of this kind.

Where ulceration has followed the use of a blister, the best application is a warm emollient poultice, and afterwards I think the black wash is serviceable.

Another inconvenience sometimes experienced from the use of a blister, is irritation of the bladder and strangury, to prevent which, camphor mixed with the plaster, or sprinked over its surface, has been recommended; but it is not found effectual for the purpose, which is better accomplished by the free use of diluents and fomentations of warm milk and water to the blistered part, after the removal of the blister.

Dr. Armstrong observes, that if a blister be put on where the skin is dirty, it leaves a permanent stain; and for the same reason he cautions us against dressing blistered surfaces with strongly coloured ointments, such as Turner's cerate.

It would involve too long a detail to enter into all the various circumstances of disease in which blisters are applied; the general intentions with which they are used may be stated to be, 1st, To act as *counter irritants* and *derivatives* in the treatment of internal inflammation, which, after blood-letting, they are one of our

most powerful means of subduing. 2d, As *stimulants*, both local and general, in cases of torpor or exhaustion.

GALBANUM PLASTER.

Take of Litharge Plaster, two pounds,
Gum Galbanum, half a pound,
Scrapings of Yellow Wax, four ounces.

Melt the galbanum, and add the litharge plaster and wax; then melt them together with a medium heat, and strain.

MEDICAL PROPERTIES AND USES.—This plaster is considered as digestive and suppurative, and is applied to indolent tumours to promote suppuration, and after the discharge of the matter to remove the remaining induration: it has been recommended to be applied over the whole lumbar region of rickety children, who have great weakness of the lower extremities.

LITHARGE PLASTER.

Take of Litharge, reduced to very fine powder,
Olive Oil, a gallon,
Boiling Water, two pints.

Mix them with a superior heat, constantly stirring until the oil and litharge unite so as to form a plaster; obviating the consumption of the water by occasionally pouring on a fresh supply.

REMARKS.—This is the ointment so well known by the name of *Diachylon*, and is an important preparation, as it forms the basis of so many others. The substance called *Litharge* is the protoxide of lead.

There is considerable attention requisite in preparing this ointment ; to stir it constantly to promote the combination of the ingredients, and to supply the place of the water dissipated by evaporation, by the addition of fresh portions, which must be added hot, as cold water will cause the mixture to explode and probably hurt the operator.

The water in this preparation is generally stated to be added only for the purpose of preventing the temperature from rising too high ; but it appears to perform a much more important part in the operation, and that however the temperature may be otherwise regulated, the presence of the water is essential to the union of the ingredients : for it was found by experiment, that when the litharge and oil were kept for several hours (by means of steam) at a temperature of 220° and constantly stirred, no combination whatever ensued ; but upon the addition of a small quantity of water, they immediately entered into a complete union. It would appear then, that the water exerts a chemical action, and probably combines with the oxide of lead, forming a hydrate which then unites with the oil.

MEDICAL PROPERTIES AND USES.—This plaster is adhesive and usually applied to excoriations of the skin, and is used for retaining the edges of fresh wounds in apposition, and at the same time defending them from the action of the air : when long kept, it changes its colour and loses its adhesive properties.

LITHARGE PLASTER WITH RESIN.

Take of Litharge Plaster, three pounds and a half,
Yellow Resin, half a pound.

Having melted the litharge plaster with a medium

heat, sprinkle in the resin reduced to fine powder, and make a plaster.

MEDICAL PROPERTIES AND USES.—In this preparation the litharge plaster is rendered more adhesive and somewhat more stimulating by the resin: it is used for keeping on other dressings, for retaining the edges of recent wounds together, and for contracting the size of ulcers and assisting their granulation and cicatrization according to the excellent method of Mr. Baynton: the plaster used by Mr. Baynton contained much less resin, six ounces only to the pound of litharge plaster.

OPIUM PLASTER.

Take of Opium, reduced to powder, half an ounce,
Burgundy Pitch, three ounces,
Litharge Plaster, a pound.

Having melted the plaster, add the opium and pitch, taking care to mix them completely.

REMARKS.—This plaster is now introduced for the first time into this Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is considered anodyne, and is applied in rheumatic and other local pains, but its virtues are at least equivocal.

WARMING PLASTER.

Take of Plaster of Cantharides, one part,
Burgundy Pitch, seven parts.

Melt them with a medium heat; mix well and make a plaster.

MEDICAL PROPERTIES AND USES.—This is a useful stimulant and rubefacient, and may be applied with advantage in catarrh, local pains, &c. Although in general it does not blister, I have found it do so effectually with some persons.

SOAP PLASTER.

Take of Litharge Plaster, three pounds,
Shavings of Hard Soap, half a pound.

Having melted the plaster with a gentle heat, mix in the soap, then boil so as to form a plaster.

REMARKS.—I am informed by Mr. Scanlan, who prepares this plaster in large quantities, that the quantity of soap here ordered is twice too great, the plaster being, when prepared by this formula, quite pulverizable and falling into crumbs. Mr. Powell makes nearly a similar observation on the London formula.

MEDICAL PROPERTIES AND USES.—Soap plaster is considered discutient, and with this intention is applied to tumours, but for such a purpose is quite inferior to the Ammoniac plaster with mercury.

COMPOUND SOAP PLASTER, OR ADHESIVE PLASTER.

Take of Soap Plaster, two ounces,
Litharge Plaster, with resin, three ounces.

Make a plaster, which should be melted and spread on linen.

REMARKS.—This plaster is now introduced for the

first time into this Pharmacopœia, and is not ordered by the other colleges.

MEDICAL PROPERTIES AND USES.—Similar to those of the litharge plaster with resin, but less apt to irritate, owing to the much smaller proportion of resin. It is a very useful application to those abrasions of the skin, which take place in consequence of long confinement to bed.

FRANKINCENSE PLASTER.

Take of Litharge Plaster, two pounds,
Frankincense, half a pound,
Red Oxide of Iron, three ounces.

Having melted the plaster and frankincense together, sprinkle in the oxide, stirring them together to form a plaster.

REMARKS.—This is very nearly the old *Emplastrum roborans*, in which however dragon's blood was used instead of the red oxide of iron.

MEDICAL PROPERTIES AND USES.—It is supposed to be useful as a tonic, and is used in muscular relaxations and weakness of the joints: but most probably its effects depend merely on the mechanical support given to the parts.

PREPARATIONS.

SECTION X.

EXTEMPORANEOUS PREPARATIONS.

COMPOUND LIME WATER.

Take of the Shavings of Guaiac Wood, half a pound,
Liquorice Root, sliced and bruised, an ounce,
Sassafras Bark, bruised, half an ounce,
Coriander Seeds, three drachms,
Lime Water, six pints.

Macerate without heat for two days in a closed vessel, shaking it from time to time, then strain.

MEDICAL PROPERTIES AND USES.—It is alterative, and has some influence on the state of the skin, which makes it useful in cutaneous affections: it appears an unnecessary formula while the *Decoctum Guaiaci Compositum* is retained.

TAR WATER.

Take of Tar, two pints,
Water, a gallon.

Mix, stirring with a stick for a quarter of an hour; then, as soon as the tar subsides strain the liquor, and keep it in well stopped jars.

REMARKS.—The water dissolves a portion of the tar and becomes impregnated with empyreumatic oil, a small portion of resinous matter, and acetic acid: the solution has the colour of Madeira wine, and a sharp empyreumatic taste.

MEDICAL PROPERTIES AND USES.—Tar water was first brought into reputation by Bishop Berkley, but experience having altogether invalidated its claims to the extraordinary virtues attributed to it, it has fallen into disuse. Sir Alexander Crichton has published “An Account of some experiments made with the vapour of boiling Tar in the cure of Pulmonary Consumption;” and Dr. Paris mentions that having made trial of its effects, he thinks it may in some cases be attended with benefit. For the mode of using it, see *Pharmacologia*, vol. ii. p. 373.

CATAPLASMS.

CATAPLASM OF ALUM.

Take the Whites of two Eggs,
Alum, a drachm.

Shake them together to make a coagulum.

REMARKS.—This is now ordered for the first time, and does not appear in the London or Edinburgh Pharmacopœia. Another kind of alum poultice in use is made by coagulating milk with alum, and using the curd as a poultice.

MEDICAL PROPERTIES AND USES.—In cases of chronic and purulent ophthalmia it is applied to the eye, between two folds of old linen. It has been praised also as a good application to chilblains which are not broken.

CATAPLASM OF CHARCOAL.

Take a sufficient quantity of Wood Charcoal red hot from the fire, and having extinguished it by sprinkling dry sand over it, reduce it to a very fine powder.

Add it to the simple cataplasm warm.

REMARKS.—This poultice is now introduced for the first time into this Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is antiseptic, and is applied to improve the condition of foul unhealthy ulcers and gangrenous sores.

CATAPLASM OF HEMLOCK.

Take of the Leaves of Hemlock, dried, an ounce,
Water, a pint and a half.

Boil down to a pint, and having strained the liquor, add as much of the same kind of powder as is sufficient to form a cataplasm.

REMARKS.—This is not the usual mode of preparing hemlock poultice, which is generally made by adding to the unstrained decoction as much linseed meal as will make it of a proper consistence: another mode of preparing it, preferred by many, is to use the fresh leaves bruised.

MEDICAL PROPERTIES AND USES.—It is an excellent application to many cancerous and scrofulous ulcers and other malignant sores, frequently alleviating the pain and improving their appearance.

CARROT CATAPLASM.

Take of the Root of the Cultivated Carrot, any quantity.

Boil the root in water until it becomes soft enough to form a cataplasm.

MEDICAL PROPERTIES AND USES.—This poultice is antiseptic, and is used to correct the foul discharge of fœtid and ill conditioned sores, and to allay the pain of cancerous and phagedenic ulcers. Young carrots, reduced to a pulp, are sometimes applied with advantage to allay the pain of chopped nipples.

YEAST CATAPLASM.

Take of Yeast, half a pound,
Flour, a pound.

Mix, and apply an inferior heat until the mixture begins to swell.

REMARKS.—The yeast excites fermentation in the flour, and causes the extrication of carbonic acid gas, on which the efficacy of the poultice is supposed to depend. A very good substitute for this poultice may be made by adding to equal parts of oatmeal and linseed meal as much dregs of porter as will be sufficient to make the poultice of a proper consistence. In our hospitals a mixture of potatoes and meal is used instead of flour.

MEDICAL PROPERTIES AND USES.—This poultice is applied with great advantage to painful gangrenous and sloughing sores; it corrects the fœtor of the discharge, and assists the separation of the sloughs.

SIMPLE CATAPLASM.

Take of the Powder for a Cataplasm, any quantity.

Boiling water enough to form a tepid Cataplasm, which should be smeared over with olive oil.

MEDICAL PROPERTIES AND USES.—It is emollient and suppurative, and is applied to inflamed parts and irritable sores.

MUSTARD CATAPLASM.

Take of Mustard Seed,

Linseed, of each, bruised, half a pound,

Warm Vinegar, a sufficient quantity.

Make a cataplasm ; which may be made more stimulating by adding two ounces of the scrapings of horse radish root.

REMARKS.—This is generally known in practice by the name of a *Sinapism*. The present formula is copied from the London Pharmacopœia, and linseed substituted for crumb of bread : this cataplasm may be made a powerful vesicatory by the addition of oil of turpentine. Chevallier advises the use of mustard deprived of its oil.

MEDICAL PROPERTIES AND USES.—It is actively stimulant and rubefacient, inflaming and even vesicating the part to which it is applied if left long on. Spread on cloths to the thickness of about half an inch, it is frequently applied to the soles of the feet in cases of low fever attended with stupor, and where there is coma, or determination of blood to the head, as in apoplexy. It

operates on the same principle as a blister, but much more quickly, in which its advantage consists.

Dr. Blackhall observes, that the effects of mustard cataplasms quickened with oil of turpentine, and laid on the chest in typhoid pneumonia, are very striking; they produce within an hour excessive pain, and an inflammation entering more into the true skin than that which is excited by Cantharides; and he adds, that he has seen them beyond any doubt rescue from impending suffocation.—*Essay on Dropsies*, p. 334.

DECOCTIONS.

Decoctions are aqueous solutions of the active principles of vegetables, obtained by boiling; by which it is intended to procure more powerful remedies than can be had by infusion of the same substances in cold, or even boiling water, which however does not always follow, for although the increase of temperature and continued boiling facilitates and expedites the solution of some fixed principles, it at the same time extracts inert and nauseous substances, which remain untouched by simple infusion: decoction decidedly impairs the properties of vegetables whose active principle is volatile, by dissipating it; and when it consists chiefly of extractive matter, long boiling, by favouring its oxidizement, renders it insipid, insoluble, and inert: decoction therefore can only be used with advantage for the extraction of principles which are neither volatilized, nor decomposed by a boiling heat.

In making decoctions, the substances employed should be divided by pulverization or slicing, so as to expose an extended surface to the action of the water, which is thus enabled to take up their soluble principles more com-

pletely, and in a much shorter time, which is in many cases a matter of great importance. Decoctions should be made in vessels sufficiently large to prevent any risk of their running over: the substances should be completely covered by the water, the vessels lightly closed to prevent, as far as possible, the access of the air, and the boiling should be gentle, and continued without interruption.

It is important that the water employed for making decoctions, should not be what is called *hard water*.

In compound decoctions all the ingredients ought not to be put in at once, but first those whose virtues, owing to their hardness and insolubility, are extracted with most difficulty; and if any aromatic or other substances containing volatile principles or oxidizable matter are to be employed, they ought not to be added until near the close of the boiling, as in the decoctions of guaiac and of logwood; or the boiling decoction should be simply poured upon them and covered up till nearly cold.

In general, however, decoctions ought to be strained while hot, because on cooling they deposit a part of the dissolved matter, which may be as active as that which remains dissolved, but would thus be lost; whereas by straining the decoction while hot, this deposit may be afterwards mingled with the clear fluid by shaking the medicine when the dose is to be taken.

It is better not to use too fine a filtre, as it frequently happens that the virtues of a decoction depend upon the presence of particles which are suspended in a minutely divided state.

Decoctions cannot be kept ready prepared, as they very soon become turbid, and run into a state of fermentation; in general they are not fit for use when they have been more than two days made, particularly in summer.

COMPOUND DECOCTION OF ALOES.

Take of Extract of Liquorice, half an ounce,
 Carbonate of Potash, two scruples,
 Hepatic Aloes, bruised,
 Myrrh, bruised,
 Saffron, of each a drachm,
 Water, a pint.

Boil them together down to twelve ounces, then strain and add four ounces of Compound tincture of Cardamoms.

REMARKS.—By the addition of the alkali in this preparation the water is enabled to dissolve a much larger proportion of the Aloes than it otherwise could, while another portion is kept suspended by the myrrh, and the mucilage of the liquorice, the tincture of cardamoms renders the medicine more grateful, and prevents spontaneous decomposition from taking place: it may be kept without spoiling for a longer time than almost any other compound decoction.

This preparation is intended to resemble and be a simplification of the well known *Baume de vie* of Lelievre, from which however it differs a good deal in its composition. Lelievre's formula was as follows: Take of socotorine aloes and of theriac of each an ounce; of gentian half an ounce; rhubarb ten drachms; saffron, agaric, zedoary and myrrh, of each two drachms; sugar four ounces; and spirit of wine two pounds.

MEDICAL PROPERTIES AND USES.—It is a warm, gentle cathartic, and may be given with advantage in habitual costiveness, dyspepsia, jaundice, and chlorosis. I have found it eminently useful in cases of suppressed catamenia, connected with a torpid state of the digestive system.

DOSE.—One ounce to two.

DECOCTION OF MARSH MALLOW.

Take of the Herb and Root of Marsh Mallow, dried
and bruised, four ounces,
Raisins stoned, two ounces,
Water, seven pints.

Boil down to five pints: having strained the liquor set it aside until the fæces have subsided, and decant.

REMARKS.—This formula is now introduced for the first time, and is copied from the Edinburgh Pharmacopœia. The mallow abounds in mucilage, which is dissolved by the water, and the flavour of the decoction is rendered more palatable by the raisins.

MEDICAL PROPERTIES AND USES.—It is an eligible demulcent in visceral inflammations, particularly those of the kidneys, in calculous affections, gonorrhœa, strangury, and other diseases of the urinary organs, during which complaints from one to three pints may be drank in the course of the day. The simple decoction is recommended as an injection to be thrown into the vagina in cases of difficult labour arising from rigidity of the soft parts.

COMPOUND DECOCTION OF CHAMOMILE.

Take of Chamomile Flowers, dried, half an ounce,
Fennel Seeds, two drachms,
Water, a pint.

Boil for a short time and strain.

REMARKS.—If the fennel seeds are of any use in this

preparation, it would be better not to add them till towards the conclusion of the boiling.

MEDICAL PROPERTIES AND USES.—This decoction is used as an enema or as a fomentation ; for the latter of which purposes the fennel seeds are a very unnecessary addition. It is generally said that the virtues of this decoction, as a fomentation, depend altogether on the warm water, but I do not believe this to be correct, as I am satisfied that the chamomile stupe is more efficacious and soothing than warm water alone. This decoction is the vehicle used in the formation of the cathartic and foetid glysters of this Pharmacopœia.

DECOCTION OF CINCHONA.

Take of the Bark of the Lance-leaved Cinchona,
coarsely powdered, an ounce,
Water, a sufficient quantity to afford a pint
after straining.

REMARKS.—Some part of this formula appears to have been omitted, as no directions are given for boiling the ingredients, nor any time assigned for continuing the operation.

The former edition of this Pharmacopœia directed a pint of water to be boiled on the bark in a covered vessel for ten minutes, and the decoction to be strained while hot ; and these are very nearly the directions given by the other colleges.

The bark is ordered to be only coarsely powdered, as it is one of those substances whose properties are impaired by minute pulverization ; long boiling is also injurious to it, and the decoction should be strained while hot, because on cooling it deposits a powder upon which

much of its efficacy depends, and which should be diffused through the liquor when about to be used.

From the experiments of M. Henry, there is reason to believe that the decoction of cinchona might be made much more efficacious, by boiling the bark in water acidulated with sulphuric acid, and containing some isinglass, which latter forms with the tannin an insoluble tannate, while the cinchonine unites to the acid forming a sulphate of cinchonine which is very soluble.

MEDICAL PROPERTIES AND USES.—Similar to those of the infusion. The decoction of cinchona, particularly of the *C. cordifolia* or yellow bark, is one of the best antidotes in case of an over dose of Tartar emetic; an ounce of the decoction being capable of decomposing and rendering inert a scruple of that salt.

DECOCTION OF WOODY NIGHTSHADE.

Take of the twigs of Woody Nightshade, sliced, an ounce,

Water, a pint and a half.

Boil down to a pint, and strain.

REMARKS.—This formula is now introduced for the first time into this Pharmacopœia, and is copied from that of London.

The active principle of the *Solanum Dulcamara* was first discovered by M. Desfosses, of Besançon, in the leaves and stalks, and named *Solanine*; it is taken up by the boiling water, from which it may be again precipitated by ammonia or magnesia.

MEDICAL PROPERTIES AND USES.—Dulcamara was formerly much esteemed as a remedial agent, and it is still appreciated on the continent much more than in

this country. This decoction is generally considered diuretic and narcotic, and has been found useful in humoral asthma, dropsy, lepra vulgaris and alphas, and in some of the cutaneous affections of a syphilitic character. Professor Richter, of Göttingen, states that he has employed it in *Phthisis Pituitosa* with very extraordinary success; and Sir A. Crichton says, that in the few cases of chronic tubercular phthisis in which he has given it, it appeared to increase the powers of the Sarsaparilla with which it was usually combined.

Chevallier, mentions the case of a young man, who after having carried a quantity of Dulcamara on his head, was affected with narcotism, which lasted ten hours.—*Dict. des Drogues, Simp. et Comp. Art. Cucuphes.*

DOSE.—Half an ounce to an ounce.

DECOCTION OF CABBAGE TREE.

Take of the bark of the Cabbage Tree, bruised, an ounce,
Water, two pints.

Boil down to a pint, and to the strained liquor add two ounces of syrup of orange peel.

REMARKS.—This decoction is now, for the first time, ordered in this Pharmacopœia. It has the colour of Madeira wine, a disagreeable odour, and a bitter mucilaginous taste.

The properties of the *Geoffroya inermis* were first made known in this country by Mr. Peter Duguid, of Jamaica, and Dr. Wright afterwards gave a botanical description of the tree, and a further account of its virtues.

MEDICAL PROPERTIES AND USES.—It operates as

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a cathartic, but is also narcotic. Its chief use is as an anthelmintic, particularly for the expulsion of lumbrici; if disagreeable symptoms should arise from an over dose, or from drinking cold water during its action, castor oil should be given and acidulated fluids. It is very little used in this country.

DOSE.—Half an ounce to two ounces.

DECOCTION OF LIQUORICE.

Take of Liquorice Root, bruised, an ounce and a half,
Water, a pint.

Boil for ten minutes, and strain.

REMARKS.—This decoction is now introduced for the first time into this Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is an agreeable demulcent, and vehicle for the administration of other remedies.

COMPOUND DECOCTION OF GUAIAIACUM.

Take of Guaiac Wood, scraped, three ounces,
Sassafras Root, sliced, ten drachms,
Liquorice Root, bruised, two ounces and a
half,
Water, ten pints.

Boil the Guaiac wood in the water, and evaporate the liquor to one half; towards the conclusion of the boiling add the Liquorice and the Sassafras, and strain the liquor.

REMARKS.—This formula is now, for the first time,

introduced into this Pharmacopœia. It is one of those preparations which are generally known by the name of *Decoctions of Sweet Woods*.

MEDICAL PROPERTIES AND USES.—This decoction is esteemed in chronic rheumatism, some cutaneous affections, and as an assistant in a course of mercurial and antimonial alteratives; during its use the skin ought to be kept warm to assist its action.

DOSE.—From four to sixteen ounces in the course of the day.

DECOCTION OF LOGWOOD.

Take of the Shavings of Logwood, an ounce and a half,
Cinnamon Bark, bruised, a drachm,
Water, two pints.

Boil the wood in the water, and evaporate the liquor to a pint: towards the end of the boiling add the Cinnamon bark and strain.

REMARKS.—This decoction is now introduced for the first time into this Pharmacopœia, and is not ordered by the other colleges.

MEDICAL PROPERTIES AND USES.—For these see the observations on the Extract, p. 499.

DOSE.—One ounce to three.

DECOCTION OF BARLEY.

Take of the Seeds of Barley, freed from their husks,
two ounces.

Having first cleaned the barley in cold water, boil it for a short time in half a pint of water, then throwing away the liquor, put the barley into five pints of boiling water: boil until half the water is consumed, and strain.

REMARKS.—The object of the different proceedings here ordered, is to insure greater elegance in the appearance of the fluid, which would otherwise be turbid and less grateful.

MEDICAL PROPERTIES AND USES.—It is a very grateful diluent in fevers and other acute disorders, and may occasionally be made more agreeable by the addition of a little lemon juice. It is an eligible vehicle for other medicines, particularly as the basis of some cough mixtures: mixed with an equal quantity of good milk and a small portion of sugar, it is an excellent substitute for the breast milk.

COMPOUND DECOCTION OF BARLEY.

Take of Decoction of Barley, four pints,
 Raisins stoned,
 Figs sliced, of each two ounces,
 Liquorice Root, sliced and bruised, half an ounce.

During the boiling, add the raisins first, then the figs, and lastly the liquorice, a little before the conclusion of the boiling, which is completed when there remains only what will afford two pints of strained liquor.

MEDICAL PROPERTIES AND USES.—In addition to the properties of the simple decoction, this possesses more flavour and has a slightly aperient effect. It is used as a demulcent and diluting drink in inflammatory

affections. Equal parts of it and of decoction of bark form a useful gargle in cynanche maligna.

DECOCTION OF ICELAND LIVERWORT.

Take of Iceland Liverwort, half an ounce,
Boiling Water, a pint.

Digest for two hours in a closed vessel, then boil for a quarter of an hour, and strain the liquor while hot.

REMARKS.—From the analyses which have been made of the *Cetraria Islandica*, it appears that it contains a large proportion of a mucilaginous and nutritive principle, united with a bitter substance, both of which are taken up in this decoction, owing to which it may, besides its nutritive property, have some action as a tonic; but the bitter principle renders the preparation too nauseous to be used in sufficient quantity to have much effect as an article of diet. By previous maceration it may be freed from its bitter and rendered much more agreeable.

The syrup of Iceland moss is a very popular form for the administration of this remedy. The following formula for its preparation is given by Chevallier: Take of Iceland liverwort an ounce, simple syrup two pounds, wash the liverwort repeatedly in cold water, then prepare a decoction with two pints of water, strain it, add the simple syrup, and boil to a proper consistence.

An alga, found I believe chiefly on the shores of the counties of Clare and Sligo, and called *Carrageen Moss*, has been lately much used in this country as a substitute for *Iceland moss*: as a demulcent it is, I believe, in no respect inferior, and possesses fully as much, if not more, of the nutritious principle.

MEDICAL PROPERTIES AND USES.—The decoction of Iceland moss, as it is generally called, was first recommended to the profession by Linnæus, from the good effects which he saw produced by it in Sweden in the treatment of coughs. It was soon extravagantly extolled as a remedy in pulmonary complaints, and even for phthisis, and of course it soon fell into disrepute.

As a demulcent it still retains its character, and its simple bitter principle at the same time tends to produce a tonic effect, which is frequently desirable in the debilitated condition which characterizes the latter stages of pulmonary diseases.

DOSE.—A wine glass full occasionally.

DECOCTION OF MEZEREON.

Take of the Bark of Mezereon, two drachms,
Liquorice Root, bruised, half an ounce,
Water, three pints.

Boil down to two pints, and strain.

REMARKS.—This formula is now introduced into this Pharmacopœia for the first time, and is copied from that of Edinburgh.

MEDICAL PROPERTIES AND USES.—It was formerly esteemed as a sudorific, and supposed to be useful in venereal nodes and the pains which accompany the secondary forms of syphilis, but experience seems to have greatly invalidated its claims in this respect. It has been given with seeming benefit in chronic rheumatism.

DOSE.—From four to six ounces.

DECOCTION OF POPPY.

Take of the Capsules of the White Poppy, sliced,
four ounces,
Water, two pints.

Boil for a quarter of an hour and strain.

REMARKS.—This decoction is now, for the first time, ordered in this Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is a very useful fomentation in painful swellings, and in the excoriations produced by the thin acrid discharge of ulcers. It is a very soothing injection for throwing into the vagina in cases of cancer uteri.

DECOCTION OF WINTER-GREEN.

Take of Winter-Green, an ounce,
Water, two pints.

Macerate for six hours, then take out the Winter green, and having bruised it, return it to the liquor and evaporate the mixture until there remains enough to afford a pint of liquor strained with expression.

REMARKS.—This decoction is now introduced for the first time, and is not ordered by the other colleges.

MEDICAL PROPERTIES AND USES.—The *Pyrola umbellata* which was first brought into repute by Dr. Somers, (see Med. Chir. Trans. vol. v.) possesses diuretic and tonic properties, and occasionally appears to have a laxative effect also: this decoction supplies an eligible form for its administration. It has been used with

success for the removal of ascites and other forms of dropsy, after digitalis and other remedies had failed; it is said also to have been useful in acute rheumatism, intermittents, and other diseases assuming an intermittent type. Dr. Ives, of America, states that it will frequently mitigate symptoms of gravel, and strangury proceeding from other causes; he has also given it alternately with *Uva Ursi* in hæmaturia, the effects of severe and long continued gonorrhœal inflammation, with the most obvious benefit. In some instances it has appeared to afford great relief in chronic cutaneous affections, particularly if they are attended with anasarca of the part affected.

Dr. Beatty has published a very satisfactory instance of its efficacy in a case of dropsy, after several other remedies had been tried in vain.—See *Trans. of Assoc. of Coll. Phys.* vol. iv. p. 23.

DOSE.—Two or three ounces, three or four times a day.

DECOCTION OF OAK BARK.

Take of Oak Bark, an ounce,

Water, two pints,

Boil down to a pint and strain.

REMARKS.—The properties of oak bark have been already averted to at p. 501, which see: its active principles being all soluble in water, are taken up in this decoction.

MEDICAL PROPERTIES AND USES.—It is chiefly used as a local astringent in the forms of gargle and lotion, or injection: as a gargle in relaxation of the uvula

and in cynanche; as an injection in different forms of prolapse of the vagina, uterus, or rectum, &c.

Dr. Eberle states, that in the intermittents of very young children he has, in some cases, used this decoction as a bath with efficacy.

Its internal administration in obstinate diarrhœas and alvine hæmorrhages has also been found beneficial.

Dose.—One or two ounces.

DECOCTION OF SARSAPARILLA.

Take of Sarsaparilla Root, sliced, and cleansed with cold water, four ounces,
Boiling Water, four pints.

Digest with a medium heat for four hours in a vessel lightly covered, then take out the Sarsaparilla and bruise it; and having done so return it into the liquor, boil down to two pints, and strain.

REMARKS.—Notice has already been taken of the injury done to Sarsaparilla by long boiling, see pp. 521, et seq.: and I may add, that it appears from the experiments of Mr. Battley and Mr. Pope, that the root merely bruised and macerated in water of 180° Fahr. will yield up all its medicinal properties, so that there would appear to be no necessity for the troublesome operation above ordered. This is the opinion of Dr. A. T. Thomson also, from which, however, Dr. Paris dissents, and thinks that this decoction is “seldom boiled for a sufficient length of time.”

MEDICAL PROPERTIES AND USES.—These have been already mentioned under the head of the *Extract*, p. 523. The decoction is the form most frequently employed for the administration of Sarsaparilla, and its

strength is often increased by dissolving a certain proportion of the extract in it, and adding some of the syrup. In addition to the benefit obtained from the use of this decoction in the secondary forms of venereal affection, it has been used with considerable advantage in the treatment of dysuria, and in morbid irritability of the bladder occasioning incontinence of urine.

In that condition of the system which is generally termed a broken down constitution, the preparations of Sarsaparilla appear to be productive of great benefit.

Dose.—Four to six ounces three times a day.

COMPOUND DECOCTION OF SARSAPARILLA.

Take of the Decoction of Sarsaparilla, boiling hot,
four pints.

Sassafras Root, sliced and bruised,

Guaiac Wood, scraped,

Liquorice Root, bruised, of each an ounce,

The Bark of Mezereon Root, three drachms.

Boil for a quarter of an hour and strain.

REMARKS.—This is an imitation of the once celebrated *Lisbon diet drink*, and is very generally known by the name of the *Decoction of Sweet Woods*.

MEDICAL PROPERTIES AND USES.—These differ but little from those of the simple decoction. The Mezereon, which is the only active ingredient added, being used in so small a quantity that it can produce very little effect. It operates as a diaphoretic and alterative, and is found useful in the treatment of secondary syphilis, chronic rheumatism, lepra, and some other cutaneous affections. It appears to have been prescribed by Massa in 1536, as an antisiphilitic remedy.

Dose.—From four to six ounces three times a day.

DECOCTION OF RATTLESNAKE ROOT.

Take of Rattlesnake Root, three drachms,
Water, a pint and a half.

Boil down to eight ounces and strain.

REMARKS.—This decoction is now ordered for the first time in this Pharmacopœia. The subject derives its name from its being used by the Senagaro Indians as a remedy for the bite of the rattlesnake.

MEDICAL PROPERTIES AND USES.—Senega is a stimulating expectorant and diuretic, and in large doses is emetic and cathartic. It acts as a stimulant to the absorbents, and consequently augments the excretions, particularly that of urine, and sometimes occasions pyalism. By some it has been found useful in dropsy, and in some forms of pulmonary affections attended with debility and inordinate secretion, as humoral asthma, and chronic catarrh. In America the decoction given in divided doses, until it either vomit or purge, has been employed with seeming success in croup; it has also been used as a stimulant gargle in the same disease. It has been extolled in chronic rheumatism in conjunction with guaiacum and ammonia, as in the following formula:

℞ Tincturæ Guaiaci ʒi.
Mellis ʒi. tere simul et adde
Decoct. Senegæ ʒiiss.
Ammoniæ Carbonatis gr. vi.
Fiat haustus sextâ quâque horâ sumendus.

DOSE.—One ounce to three, three or four times a day.

DECOCTION OF DANDELION.

Take of the fresh herb and root of Dandelion, four
 ounces,
 Water, two pints.

Boil down to a pint, and strain the expressed liquor.

REMARKS.—This decoction is now ordered for the first time, and does not appear in the London or Edinburgh Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is purgative and tonic. The uses of *Taraxacum* have been already mentioned under the head of the Extract, p. 503, which see. Dr. A. T. Thompson informs us, that in cases of sluggish bowels, and with serous effusion, he found the addition of the bitartrate of potash greatly to improve the efficacy of this decoction.

DOSE.—One to three ounces, two or three times a day.

DECOCTION OF WHITE HELLEBORE.

Take of the Root of White Hellebore, powdered, an
 ounce,
 Water, two pints,
 Rectified Spirit, *by measure*, two ounces.

Add the hellebore root to the water, boil it down to a pint, and when it has grown cold add the spirit.

REMARKS.—This decoction is now introduced for the first time, and the formula copied from the London Pharmacopœia.

MEDICAL PROPERTIES AND USES.—The active prin-

ciple of the white hellebore, which has been named *Veratrine*, is partially taken up in this decoction, rendering it acrid and violent in its operation, so that it is not used internally, but, like the ointment, see p. 586, is used externally for the cure of scabies, tinea, and some other cutaneous affections. If the skin be very irritable and tender it should be diluted with an equal quantity of water.

DECOCTION OF ELM BARK.

Take of the fresh inner Bark of Elm, bruised, two
 ounces,
 Water, two pints.

Boil down to a pint, and strain.

MEDICAL PROPERTIES AND USES.—This decoction was formerly in repute for the treatment of cutaneous diseases, but has now fallen into almost total discredit.

DOSE.—Four to six ounces, three times a day.

ARABIC EMULSION.

Take of Gum Arabic, in powder, two drachms,
 Sweet Almonds, blanched,
 Refined Sugar, of each half an ounce,
 Water, a pint.

Dissolve the gum in the water made hot, and as soon as the mixture has grown completely cold, pour it gradually on the almonds, previously pounded with the sugar, and rub them together until the liquor assumes the appearance of milk; then strain.

REMARKS.—In preparations of this description the vegetable oil is diffused through the water, and kept suspended in it by means of the sugar and mucilage: but after some time it separates and rises like a thick cream to the surface; the fluid beneath becomes whey-like in appearance, and soon becomes acescent from the fermentation of the saccharine matter.

By heat the same decomposition is immediately effected.

The addition of vinous spirit, or of any weak acid, decomposes emulsions, separating the oil; in prescribing them, therefore, it is necessary to avoid combining with them any spirit or tincture (except in very small quantity) or any substance having acidity: some further remarks on this subject will be found under the head of *Almond Mixture*.

MEDICAL PROPERTIES AND USES.—This emulsion is much used as a demulcent and diluent in inflammatory fevers, strangury, dysuria, and other affections of the urinary organs. It is frequently employed as an agreeable vehicle for more active remedies.

DOSE.—From one ounce to eight.

CLYSTERS.

REMARKS.—The remedies so named seldom obtain the degree of consideration to which their usefulness entitles them; they may be made to accomplish several most important indications; to assist the tardy operation of a cathartic, or of themselves to evacuate the bowels in cases of habitual costiveness, where the state of the stomach is such that it will not retain medicines, or where there is such debility as renders their administration unsafe: to induce great *relaxation*, as when the

infusion of tobacco is employed ; to act as *astringents*, or as *anodynes* ; to destroy *ascarides* ; to act as an *emollient fomentation*, and to convey *nutriment*.

The quantity of fluid employed, and its strength, should be regulated by the intention we wish to fulfil, and by the age of the patient : where our object is simply to evacuate the bowels, we use a quantity of fluid sufficient to distend to a greater or less degree the intestinal tube ; for this purpose the quantity generally employed is from ten or twelve ounces to sixteen, and in very urgent cases much larger quantities of fluid may be injected with safety, and sometimes with signal benefit.

When, on the contrary, our object is to allow the clyster to act as an anodyne, or astringent, to destroy worms, &c. it should not be made to exceed four or at most six ounces, and the vehicle should be of a very mild unirritating kind, such for instance as thin starch, or water.

The clyster for an infant during the first year, should not exceed from one ounce to three : from one to five years old, three to six ounces ; a youth, six to eight ounces ; an adult, ten to sixteen ounces ; and the quantity of the active ingredient to be administered in this way may be estimated, in general, as about triple of that taken by the mouth : of the different modes of administering these remedies, by far the best is the valved syringe, provided with the gum elastic tube.

CATHARTIC CLYSTER.

Take of Manna an ounce, dissolve it in ten ounces
by measure of Compound decoction of
Chamomile, and add

Olive oil, an ounce,

Sulphate of Magnesia, half an ounce.

Mix.

MEDICAL PROPERTIES AND USES.—It is laxative, and is used to assist the tardy action of purgatives ; or to procure evacuations from the bowels in cases where the administration of medicine internally would be injudicious or improper. In cases of habitual costiveness, clysters consisting merely of thin gruel, or even warm water alone, are found to act very satisfactorily.

FÆTID CLYSTER,

Is made by adding to the Cathartic clyster two drachms of Tincture of Assafœtida.

MEDICAL PROPERTIES AND USES.—This clyster is used as an antispasmodic and carminative, in cases of hysteria, flatulent colic, the convulsions of infants, and sometimes for allaying the irritation caused by ascarides in the rectum.

CLYSTER OF OPIUM.

Take of Tincture of Opium, a drachm,
Warm Water, six ounces.

REMARKS.—This formula is now introduced for the first time ; its bulk is greater than is necessary, four ounces of the vehicle would be sufficient, and at the same time less likely to be expelled ; thin starch, is the vehicle most generally employed.

MEDICAL PROPERTIES AND USES.—It is anodyne, and is used in irritable states of the bladder and uterus, and in some of the painful diseases of those organs, with great relief. It is also administered in dysentery, and other diseases of the intestines.

CLYSTER OF TURPENTINE.

Take of Common Turpentine, half an ounce,
The Yolk of one Egg.

Rub them together, and add gradually ten ounces of water of a temperature not exceeding 100° Fahr.

REMARKS.—This formula is now introduced for the first time. An equally good clyster may be made by simply adding the proper quantity of oil of turpentine to some thin gruel, agitating them well together, and using before separation can take place.

MEDICAL PROPERTIES AND USES.—It is an active assistant to cathartics, and may also be administered with advantage in cases of ascarides. It is much used in cases of peritoneal inflammation, either in the above form, or made by adding oil of turpentine to the cathartic clyster.

INFUSIONS.

Infusions are aqueous solutions of vegetable matters obtained by maceration, most generally in hot water, but sometimes in cold.

Infusions prepared with warm water are considerably stronger than those made with cold water; but in some cases, particularly with regard to bitters, they are much less grateful.

Earthenware vessels are generally used for preparing infusions, but they are greatly inferior to those made of metal with their outer surfaces brightly polished, which by retaining the heat longer, will yield stronger infusions; and in those cases where it may be necessary

to continue the heat for a considerable time, this may be done by placing the vessel near the fire for a length of time sufficient to produce the effect intended.

As in the case of decoctions, the substances operated on ought to be sliced, bruised, or powdered, according to their nature, in order to expose as large a surface as possible to the action of the menstruum.

The substances which may be extracted from vegetables by water without the aid of boiling, are: gum, mucus, extractive, tannin, the bitter, narcotic and odorous principles, colouring matter, gum-resin, volatile oil, acids and alkalies; these principles, also, are less liable to be altered by infusion than by decoction; hence, those vegetables in which these are the predominant constituents, afford better preparations by infusion than by decoction.

The temperature of the solvent and the duration of its action, ought to vary according to the nature of the substances operated on, and the parts we wish to dissolve. If flowers, leaves, or any other body of a delicate texture be infused with the intention of dissolving their colouring matter, and the most easily soluble of their fixed principles, the water should be poured on them boiling, and allowed to remain a much shorter time than when barks, roots, or wood are operated on. If the substance have an odour which we desire to retain, the operation ought to be performed in a close vessel.

Infusions, like decoctions, should be made with soft water; and cannot be long kept, as they undergo decomposition, become turbid, deposit a mucous-like substance, lose their peculiar smell and taste, and undergo important changes in their medicinal effects. They should therefore be prepared in small quantities, and only when wanted.

INFUSION OF ANGUSTURA.

Take of Angustura Bark, bruised, two drachms,
Boiling Water, half a pint.

Digest for two hours in a covered vessel, and strain.

REMARKS.—This infusion is now ordered for the first time, and the formula copied from the London Pharmacopœia, where it is called *Infusum Cuspariæ*.—See *Remarks on Angustura Bark*, pp. 392-3.

MEDICAL PROPERTIES AND USES.—It possesses the stimulant and tonic properties of the bark, and is an eligible form for its administration in low fevers, bilious diarrhœa and dysentery. The addition of tincture of cinnamon improves its flavour and makes it sit lighter on the stomach.

COMPOUND INFUSION OF HORSE-RADISH.

Take of fresh Horse-radish Root, sliced,
Mustard Seeds, bruised, of each an ounce,
Compound Spirit of Horse-radish, an ounce.
Boiling Water, a pint.

Digest the root in the water for six hours in a covered vessel, and strain; then add the Compound Spirit of Horse-radish.

REMARKS.—There is an omission in the above directions; as the mustard seeds should be digested along with the horse-radish. The formula is now introduced for the first time, and is copied from the London Pharmacopœia.

This infusion keeps badly, soon becoming turbid

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from the deposition of vegetable albumen, particularly in warm weather, or if kept in a warm room.

MEDICAL PROPERTIES AND USES.—It is stimulant and diuretic, and is esteemed as antiscorbutic; it has been found serviceable in paralysis and in dropsies, particularly those which occur after intermittents, and in chronic rheumatism.

DOSE.—One or two ounces.

COMPOUND INFUSION OF ORANGE PEEL.

Take of dried Orange Peel, two drachms,
Fresh Lemon Peel, a drachm,
Cloves, bruised, half a drachm,
Boiling Water, half a pint.

Digest for a quarter of an hour in a closed vessel, and strain.

REMARKS.—This formula is now introduced for the first time, and is copied from the London Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is an agreeable stomachic, having the pleasant flavour of its ingredients. Mr. Brande recommends it as an elegant vehicle for small doses of sulphate of magnesia, ammonia, and several of the bitter tinctures.

DOSE.—One or two ounces.

INFUSION OF CLOVES.

Take of Cloves, bruised, a drachm,
Boiling Water, half a pint.

Digest for two hours in a closed vessel, and strain.

REMARKS.—This formula is now introduced for the first time, and is copied from the London Pharmacopœia; each ounce of the infusion holds in solution the active matter of six grains of cloves.

MEDICAL PROPERTIES AND USES.—It is a warm and grateful stomachic, and may be used with advantage in flatulent colic, chronic gout, and dyspepsia; particularly when it arises from the abuse of ardent spirits, accompanied with a sensation of cold in the stomach. In these cases Mr. Brande thinks its efficacy may be increased by the addition of ammonia, as in the following draught:

R Ammoniæ Carbonatis gr. vi.

Infusi Caryophyllorum ℥i.

Fiat haustus meridie et vespere sumendus.

DOSE.—One or two ounces.

INFUSION OF CASCARILLA.

Take of Cascarilla Bark, bruised, half an ounce,
Boiling Water, half a pint.

Digest for two hours in a closed vessel, and strain.

REMARKS.—This formula is now introduced for the first time, and is copied from the London Pharmacopœia.

MEDICAL PROPERTIES AND USES.—It is a light and aromatic bitter tonic; forming a good vehicle for acids and alkalies in cases of dyspepsia, combined with carbonate of soda. It is said by Dr. A. T. Thomson to form an excellent tonic in those affections of children which depend on a weak state of the digestive organs, and are accompanied by acidity.

DOSE.—One ounce to three.

COMPOUND INFUSION OF CATECHU.

Take of Extract of Catechu, two drachms and a half,
Cinnamon Bark, bruised, half a drachm,
Boiling Water, half a pint.

Digest for an hour in a covered vessel, and strain through linen.

REMARKS.—This infusion is now ordered for the first time, and the formula copied from the London Pharmacopœia. According to Dr. A. T. Thomson, the digestion here ordered is unnecessary, as by trituration of the extract with water at 212° as much of it is dissolved as the water can hold in solution, and an equally good preparation obtained in a much shorter time. This infusion will keep good for a long time, if syrup be not added to it, as directed by the Edinburgh College.

MEDICAL PROPERTIES AND USES.—It acts as a very powerful astringent, and is one of the best forms in which catechu can be administered for the cure of protracted diarrhœa. A small quantity of tincture of opium is frequently added to it with advantage. It is sometimes used as a clyster.

DOSE.—One or two ounces every third or fourth hour, or a table spoonful after every loose stool.

INFUSION OF CHAMOMILE.

Take of Chamomile Flowers, two drachms,
Boiling Water, half a pint.

Digest for twenty-four hours in a covered vessel, and strain through linen.

REMARKS.—The length of time here ordered for continuing the digestion is altogether unnecessary, as all the effect generally required can be obtained within an hour when boiling water is used; the London College restricts the time to ten minutes.

MEDICAL PROPERTIES AND USES.—It is a tonic and stomachic bitter, and as such is often used in dyspepsia with advantage; it is more grateful when prepared with cold water: the infusion is very frequently given warm to excite gentle vomiting, or to promote the action of an emetic, which it does very effectually.

DOSE.—Of the cold infusion one or two ounces.

INFUSION OF CINCHONA.

Take of Lance-leaved Cinchona Bark, reduced to fine powder, an ounce,
Cold Water, *by measure*, twelve ounces.

Triturate the bark with a little of the water, and during the trituration pour on the rest; macerate for twenty-four hours, shaking it from time to time, then pour off the clear liquor.

REMARKS.—In the former edition this was called *Infusum Cinchonæ sine Calore*. It is a very elegant and light preparation of bark, which will sit well on delicate stomachs: but the sulphate of quinine in solution, from the readiness with which such a preparation can be made, and its strength increased or diminished as required, has now almost superseded every other form for the administration of bark. By the use of water acidulated with sulphuric acid, considerably more of the active principle of the bark may be taken up, and in a more efficient form.—See *Remarks on the Decoction*, pp. 607-8.

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MEDICAL PROPERTIES AND USES.—This is so weak a preparation, that it is not available in any case where the full operation of the remedy is required, but is used as a bitter tonic in weak states of the stomach, for which purpose the bark is not unfrequently infused in wine.

DOSE.—One ounce to three.

INFUSION OF COLOMBA.

Take of Colomba Root, sliced, two drachms,
Boiling Water, half a pint.

Digest for two hours in a close vessel, and strain.

REMARKS.—This infusion is now ordered for the first time in this Pharmacopœia, and the formula copied from that of London, which contains twice as much colomba as the Edinburgh formula.

MEDICAL PROPERTIES AND USES.—It is a good stomachic bitter, used in dyspeptic cases: it has been found useful in restraining the nausea and vomiting of pregnancy. As it is not incompatible with preparations of iron, it may be prescribed where it is desirable to administer these in conjunction with bitters, as in the following formula, proposed by Mr. Brande:

R Infusi Colombæ ʒ xi.

Tinct. Ferri Muriatis ℥ xv.

Tinct. Colombæ ʒ i

Fiat haustus bis die sumendus.

DOSE.—One to three ounces.

INFUSION OF FOXGLOVE.

Take of the Leaves of Foxglove, dried, a drachm,
Spirit of Cinnamon, half an ounce,
Boiling Water, half a pint.

Digest for four hours in a closed vessel and strain,
then add the spirit.

REMARKS.—This formula is now introduced for the first time, and is copied from the London Pharmacopœia. It is the infusion so highly recommended by Withering; the spirit of cinnamon improves its flavour and counteracts its sedative effects.

MEDICAL PROPERTIES AND USES.—The medical effects of digitalis have been already fully noticed in the observations on the tincture, p. 406, et seq. which see.

Dr. Paris considers this infusion the best form in which we can administer digitalis, when we wish to obtain its diuretic effects as speedily as possible.

DOSE.—Half an ounce to two ounces.

INFUSION OF BUCHU.

Take of the Leaves of the *Diosma crenata*, half an ounce,
Boiling Water, half a pint.

Digest for four hours, and then strain through linen.

REMARKS.—Preparations from the *Diosma crenata* are now introduced for the first time into this Pharmacopœia, and have not as yet been sanctioned by the other British Colleges.

The *Diosma crenata* is a native of the Cape of Good Hope, of the class Pentandria, Monogynia. Nat. Ord.

Rutaceæ. The leaves are borne on the extreme twigs nearly in a verticillated order; they are petiolate, coriaceous, alternate, sometimes opposite; ovato-lanceolate, nearly pointed, about an inch in length and half an inch in breadth, with the margin crenated. The upper surface is smooth and of a beautiful bright green; the under is pale and spread with translucent glandular points.

The dried leaves are liable to be mistaken for those of Senna; but their form is different, being much broader in proportion to their length than those of senna, which are also smooth along their margins, while the Buchu leaves are indented or crenated. Their smell also is aromatic and peculiar, and their taste, when chewed, pungent, and communicating a flavour resembling that of peppermint.

Buchu leaves impart their properties both to boiling water and proof spirit, and accordingly are prescribed in the form of *Infusion* and *Tincture*, as ordered in this Pharmacopœia.

MEDICAL PROPERTIES AND USES.—Buchu leaves are used as tonic, sudorific, and diuretic. They have been found useful in rheumatism, in chronic catarrh and in chronic retention of urine. Some cases in which they were used with benefit in the treatment of diseases of the bladder, have been published by Dr. M'Dowell in the *Trans. Assoc. of Coll. Phys. in Ireland*, vol. iv. p. 131.

DOSE.—From one ounce to two.

COMPOUND INFUSION OF GENTIAN.

Take of Gentian Root, sliced,
 Orange Peel, dried, of each a drachm,
 Lemon Peel, fresh, a drachm,
 Boiling Water, twelve ounces.

Digest for an hour in a covered vessel, and strain.

REMARKS.—In the former edition proof spirit was ordered as an ingredient in this infusion, but is now omitted; it was intended to aid the solvent power of the water and preserve the infusion, but on neither account is it necessary, the infusion can at all times be prepared when wanted, and the boiling water is sufficient of itself to take up the greater part of the active matter of the ingredients, besides which the use of a preparation, one-fourth of which was ardent spirits, was very objectionable, particularly when long continued. Dr. A. T. Thomson's observations refer to the former formula, and not to the present.—*Dispensatory*, 1830, p. 833.

MEDICAL PROPERTIES AND USES.—The medical properties of Gentian have already been sufficiently noticed, see pp. 410, 496, the infusion as above ordered, is a very elegant form for its administration.

DOSE.—One or two ounces three or four times a day.

COMPOUND INFUSION OF LINSEED.

Take of Linseed, bruised, an ounce,
Liquorice Root, sliced, half an ounce,
Boiling Water, two pints.

Digest for four hours in a covered vessel, and strain.

MEDICAL PROPERTIES AND USES.—This a very useful demulcent, and is used in gonorrhœa, dysuria, and sometimes in catarrh. It may be rendered much more grateful by the addition of a small quantity of lemon rind and sugar.

DOSE.—Two or three ounces frequently repeated.

SIMPLE INFUSION OF MINT.

Take of the Leaves of Spearmint, dried, two drachms,
Boiling Water, a sufficient quantity to afford
six ounces of strained liquor.

REMARKS.—This formula is incomplete, no mention being made of what is to be done with the ingredients, or the length of time the leaves are to be infused, which ought to be half an hour. See the directions given in the following formula.

MEDICAL PROPERTIES AND USES.—This is a good stomachic infusion, and generally used as a vehicle for other remedies calculated to quiet an irritable stomach, see remarks on *Spearmint Water*, p. 360-1, where a good formula for the purpose is given.

DOSE.—One or two ounces.

COMPOUND INFUSION OF SPEARMINT.

Take of the Leaves of Spearmint, dried, two drachms,
Boiling Water, a sufficient quantity to afford
six ounces after straining.

Digest for half an hour in a covered vessel, and when the liquor has grown cold, strain ; then add

Refined Sugar, two drachms,
Oil of Spearmint, three drops, dissolved in
Compound Tincture of Cardamoms, half an
ounce.

Mix.

MEDICAL PROPERTIES AND USES.—This infusion is a very grateful stomachic, slightly stimulating and diaphoretic ; and well calculated to allay irritability of the

stomach; it is also an eligible vehicle to cover the taste of disagreeable medicines.

Dose.—One ounce or two frequently repeated.

INFUSION OF QUASSIA.

Take of Quassia Wood, rasped, a scruple,
Boiling Water, half a pint.

Digest for two hours in a closed vessel, and strain.

REMARKS.—This infusion is now, for the first time, introduced into this Pharmacopœia, and the formula copied from that of London. The quantity of quassia ordered is considerably too small, and might be doubled at least, with advantage.

MEDICAL PROPERTIES AND USES.—*Quassine*, the active principle of the quassia, being taken up by the boiling water, this infusion possesses the tonic qualities of that remedy, and is the best form for its administration. It is very useful in debility of the stomach and intestinal canal, particularly if given in combination with chalybeates or mineral acids; in irregular and atonic gout, with aromatics; and it has been observed to afford more vigour and relief to the system in the hysterical atony, to which females are liable, than cinchona, especially when combined with a small portion of sulphate of zinc.

The following formula is recommended by Dr. Paris for its administration as a tonic:

R Infusi Quassiae 3x.

Tinct. Colombæ 3i.

Tinct. Ferri Muriatis m̄x.

Fiat haustus, quotidie, hora meridiana sumendus.

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Mr. Brande recommends this infusion, sweetened with brown sugar, as an effectual and safe poison for flies.

DOSE.—One ounce to three, twice or thrice a day.

INFUSION OF RHUBARB.

Take of the Root of Rhubarb, sliced, a drachm,
Boiling Water, half a pint.

Digest for two hours in a covered vessel, and strain.

REMARKS.—This infusion is now introduced for the first time, and the formula copied from the London Pharmacopœia: the Edinburgh College order it to be made with the addition of spirit of cinnamon.

MEDICAL PROPERTIES AND USES.—It is slightly purgative and stomachic, but is seldom given alone; it may be made a vehicle for the administration of neutral salts, or of aromatics, as occasion may require.—See *Remarks on Rhubarb*, pp. 440, 518.

DOSE.—From one to three ounces.

ACID INFUSION OF ROSES.

Take of the Petals of the Red Rose, dried and deprived of their claws, half an ounce,
Dilute Sulphuric Acid, *by measure*, three drachms,
Boiling Water, three pints,
Refined Sugar, an ounce and a half.

First pour the water on the petals in a glass vessel, then add the acid, and digest for half an hour; when the liquor has cooled strain it, and add the sugar.

REMARKS.—Dr. Clarke, of Cambridge, detected iron in the petals of the rose; and more recently, M. F. Cartier found four grains of oxide of iron in a thousand grains of red roses.

MEDICAL PROPERTIES AND USES.—This is a very elegant astringent and refrigerant, with which intention it is sometimes given alone; but its astringent power is slight on account of the very small proportion of acid contained in it; this, therefore, must be increased by extemporaneous directions, when we desire to render the infusion effectual as a medicine. It is a very elegant vehicle for the administration of some of the neutral salts, particularly sulphate of magnesia, the nauseous taste of which it disguises; it is used also as a gargle, for which purpose it may be combined with acids, nitre, alum, or tincture of capsicum.

DOSE.—One or two ounces.

COMPOUND INFUSION OF SARSAPARILLA.

Take of Sarsaparilla Root, previously cleansed with water and sliced, an ounce,
Lime Water, a pint.

Macerate for twelve hours in a closed vessel, shaking occasionally, and strain.

REMARKS.—I believe lime water was adopted in this formula on the faith of some experiments performed in France, from which it appeared that it was an efficient solvent of the active matter of sarsaparilla.

MEDICAL PROPERTIES AND USES.—Same as those of the decoction; see p. 617.

DOSE.—Four to six ounces, two or three times a day.

COMPOUND INFUSION OF SENNA.

Take of Senna Leaves, an ounce,
Ginger Root, sliced, a drachm,
Boiling Water, a pint.

Digest for an hour in a covered vessel, and strain the liquor.

REMARKS.—It would be better to make this infusion in smaller quantities, and only when ordered, as by mere exposure to the air it attracts oxygen, which occasions a yellowish precipitate of oxidized extractive, which causes severe griping. An infusion made with cold water purges without griping.

MEDICAL PROPERTIES AND USES.—It is purgative even when given alone, as it often is to children with good effect. It is much used as an eligible vehicle for the administration of neutral salts and other purgatives.

DOSE.—One to three ounces.

INFUSION OF SENNA WITH TAMARINDS.

Take of Senna Leaves, a drachm.
Tamarinds, an ounce,
Coriander Seeds, bruised, a drachm,
Raw Sugar, an ounce,
Boiling Water, eight ounces.

Digest for four hours in an earthenware vessel, the inside of which is not glazed with lead, and strain.

It is made also with a double quantity of Senna.

REMARKS.—This infusion is ordered to be made in a vessel not glazed with lead, lest from the action of the

acid of the tamarinds on the lead the preparation might receive a noxious impregnation. The composition of it is not unlike Sydenham's "*potio cathartica lenitiva*."

MEDICAL PROPERTIES AND USES.—It is gently aperient, and more agreeable than the compound infusion. It may be made more active by increasing the quantity of senna.

DOSE.—One ounce to four.

INFUSION OF SIMARUBA.

Take of the Bark of Simaruba, bruised, half a drachm,
Boiling Water, half a pint.

Digest for two hours in a covered vessel, and strain.

MEDICAL PROPERTIES AND USES.—It is a bitter astringent infusion, but very little used; it has, however, been found useful in diarrhœa and dysentery, and as a tonic in intermittent fevers.

DOSE.—One or two ounces.

INFUSION OF TOBACCO.

Take of Tobacco Leaves, a drachm,
Boiling Water, a pint.

Digest for an hour in a covered vessel, and strain.

REMARKS.—This infusion is now introduced for the first time, and the formula copied from the London Pharmacopœia.

MEDICAL PROPERTIES AND USES.—This infusion is intended to be used in the form of enema, in cases of

strangulated hernia, ileus, colica pictonum, and dysuria; for which purpose however not more than half the quantity ordered in the formula ought to be used at once. Such enemata were recommended some years ago in America, in cases of difficult labour arising from rigidity of the os uteri, for the purpose of inducing relaxation and dilatation of that part; but the symptoms which followed its use in the only case in which it was tried, were so alarming as to prevent its ever been adopted in practice. I have been told that stupes of tobacco have appeared to do good in the peritoneal inflammations of puerperal women, but I have never seen them used.

INFUSION OF VALERIAN.

Take of the Root of Wild Valerian, reduced to a
course powder, two drachms,
Boiling Water, *by measure*, seven ounces.

Digest for an hour, and strain the liquor when cold.

MEDICAL PROPERTIES AND USES.—This is an eligible form for the administration of Valerian in nervous and hysteric cases.—See *Remarks on the Tincture*, p. 443.

DOSE.—One or two ounces.

LINIMENTS.

Liniments are compositions of a fluid nature, so as to allow them to be rubbed on the skin with ease. They are, in general, more active remedies than ointments, acting as local stimulants, and sometimes as anodynes for the relief of deep seated inflammation and pains.

LINIMENT OF AMMONIA.

Take of the Water of Caustic Ammonia, *by measure*,
two drachms,
Olive Oil, *by measure*, two ounces.

Mix, by shaking them together.

REMARKS.—A chemical union takes place between the alkali and the oil, by which a white soap is produced, which is kept dissolved by the water of the solution of ammonia.

MEDICAL PROPERTIES AND USES.—It is an excellent rubefacient, and as such is applied to relieve rheumatic pains, by rubbing it over the affected part, with the addition of a little camphor or extract of belladonna. It is also a very useful application in cases of inflammatory sore throat, applied by moistening a piece of flannel with it, and renewing it every four or five hours. By increasing the proportion of ammonia from an eighth to a fourth, or half, we may make the liniment actively vesicant.

LINIMENT OF LIME.

Take of Lime Water,
Olive Oil, of each *by measure*, three ounces,

Mix them by agitation.

REMARKS.—This is a solution of an earthy soap, formed by the chemical union of the lime and oil: when it is kept for a little time the soapy matter separates, so that it is always better to prepare it, when wanted for use. It is always prepared with linseed oil, and very

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generally known by the name of *Carron Oil*, see p. 327, from its being much used at the Carron iron works in cases of burns.

MEDICAL PROPERTIES AND USES.—It is a most valuable application to scalds and burns, particularly when recent, in which case its efficacy may be greatly increased by the addition of oil of turpentine, as recommended by Dr. Kentish.

COMPOUND CAMPHOR LINIMENT.

Take of Camphor, two ounces,
Water of Caustic Ammonia, *by measure*, six
ounces,
Spirit of Lavender, a pint.

Mix the water of ammonia with the spirit, then distil a pint from a glass retort, with a slow fire; lastly, in this dissolve the camphor.

REMARKS.—This liniment is now, for the first time, introduced into this Pharmacopœia from that of London. By the distillation, the water with which the ammonia was combined is left as a residuum, and a strong ammoniated alcohol is obtained, in which the camphor is then dissolved. Dr. Duncan says, that the same end might be obtained by using the strong water of ammonia of the Edinburgh College, without the trouble of distillation, and that there is no danger of its being too caustic.

MEDICAL PROPERTIES AND USES.—This is a very excellent stimulant and rubefacient, applicable in the same cases as the liniment of ammonia: it is not, like most of the other liniments, a greasy compound, and may be made an eligible vehicle for the local application

of opium. When strongly rubbed on the skin, however, it is apt to produce occasionally a good deal of irritation, and even superficial inflammation accompanied with vesication. I have used a liniment composed of two parts of this and one of turpentine, with children, as a substitute for a blister, and with good effect; or with equal parts of the anodyne liniment, I have found it highly beneficial in the removal of those distressing pains in the back, which so frequently annoy women about the close of their pregnancy.

SOAP LINIMENT.

Take of Soap, three ounces,
 Camphor, an ounce,
 Spirit of Rosemary, a pint.

Digest the soap in the Spirit of rosemary until it is dissolved, then add the camphor.

REMARKS.—This is the *Linimentum saponis compositum* of the London Pharmacopœia.

MEDICAL PROPERTIES AND USES.—This liniment is stimulant and anodyne, and is advantageously applied to relieve local pains, bruises, sprains, &c.; it forms an excellent vehicle for more active external applications, such as the tinctures of opium, and of cantharides.

SOAP LINIMENT WITH OPIUM,
 OR ANODYNE LINIMENT.

Take of Soap Liniment, *by measure*, four parts,
 Tincture of Opium, three parts.
 Mix.

REMARKS.—This formula is now introduced for the first time, and is useful as fixing the proportion of the tincture of opium: the liniment is generally extemporaneously prepared when ordered for use.

MEDICAL PROPERTIES AND USES.—The addition of the tincture of opium renders the soap liniment more effectual for the removal of local pains.

TURPENTINE LINIMENT.

Take of Ointment of White Resin, a pound,
Oil of Turpentine, half a pound.

Having melted the ointment, gradually mix the oil of turpentine with it.

REMARKS.—This liniment is now introduced for the first time into this Pharmacopœia, and the formula copied from that of London. It was first suggested by Dr. Kentish of Newcastle.

MEDICAL PROPERTIES AND USES.—This liniment was introduced into practice by Dr. Kentish as a dressing for burns, immediately after their occurrence: his plan was first to bathe the parts with warm oil of turpentine, alcohol, or camphorated spirit, and then to apply over them plasters thickly spread with this liniment: these should be renewed once a day; as the inflammation subsides, less stimulating applications, such as the linimentum calcis, should be applied, until the cure is completed.

It is also used with benefit for rubbing on parts affected with rheumatic pains.

MIXTURES.

AMMONIAC MIXTURE.

Take of Gum Ammoniac, a drachm,
Pennyroyal Water, *by measure*, eight ounces.

Triturate the gum with the Pennyroyal water gradually poured on, until the mixture assumes the appearance of milk; it should then be strained through linen.

REMARKS.—This is the *Lac Ammoniaci* of the former edition, where it was so called on account of its appearance, and it is the name by which such preparations are most generally designated: the resinous portion of the ammoniacum is suspended in the water by means of the gummy part, but after a little time the resin again subsides: if the yolk of an egg be employed the mixture is more permanent.

MEDICAL PROPERTIES AND USES.—It is a useful expectorant in dry hoarse coughs, humoral asthma, and for loosening tenacious phlegm: its best accompaniment is almond mixture, combined with which it may be at the same time made the vehicle for squills or ipecacuanha, as in the following formula:

R Misturæ Ammoniaci.
Misturæ Amygdalarum ā ā ʒvi.
Tincturæ Scillæ ℥x.
Misce pro haustu, ter in die sumendo.

DOSE.—Half an ounce to an ounce.

ALMOND MIXTURE.

Take of Sweet Almonds, blanched, an ounce and a half,

Bitter Almonds, two scruples,

Refined sugar, half an ounce.

Water, two pints and a half.

Rub the almonds with the sugar, adding gradually the water; then strain.

REMARKS.—The addition of the bitter almonds to this formula is intended to improve the flavour of the mixture, which is generally known by the name of *Almond Milk*. The London College order it to be made with the almond confection, which is a very convenient mode of making the preparation, but the bitter almonds must be added, as they are not ordered in the confection. See remarks in p. 461.

In addition to the remarks already made at pp. 326, 622, it may be observed, that great care should be taken not to use almonds that have become rancid by keeping, which not only renders the mixture very unpleasant in its flavour, and thereby defeats the intention with which it is prescribed, but likewise gives it injurious qualities.

The almonds are blanched by immersing them for a short time in boiling water, and then stripping off their peel. The success of the preparation depends upon beating the almonds to a smooth pulp, and triturating them with each portion of the water, so as to form an uniform mixture before another portion is added.

MEDICAL PROPERTIES AND USES.—These have been sufficiently noticed under the head of the Arabic Emulsion p. 622: the addition of the bitter almonds may, from their containing Prussic acid, have a slight effect in ren-

dering this mixture more suitable as a vehicle for other medicines, in catarrhal and pulmonary affections.

DOSE.—From two to four ounces, frequently repeated.

ASSAFŒTIDA MIXTURE.

Take of Assafœtida, a drachm,
Pennyroyal Water, *by measure*, eight ounces.

Triturate the Assafœtida with the water poured on gradually, until an emulsion is made.

REMARKS.—This is the *Lac assæfoetidæ* of the former edition.

MEDICAL PROPERTIES AND USES.—It is chiefly used as an enema in flatulent colic, worms, or the convulsions of children: its nauseous flavour prevents its internal administration in general.

DOSE.—Half an ounce to an ounce.

CAMPHOR MIXTURE.

Take of Camphor, a scruple,
Rectified Spirit, ten drops,
Refined Sugar, half an ounce,
Hot Water, a pint.

First triturate the camphor with the spirit, then with the sugar; lastly, add the water during the trituration, and filter the mixture through bibulous paper.

REMARKS.—Water may be said to dissolve about a nine hundredth part of its weight of camphor, or an ounce, rather more than half a grain; a larger proportion

than this however, is taken up in this preparation by the agency of the alcohol and sugar. The mixture is not very permanent, as the camphor soon separates again, and swims on the surface.

Camphor is also rendered more soluble by trituration with magnesia, as in the next formula, or with genuine wheat starch.

MEDICAL PROPERTIES AND USES.—This is a very elegant mode of administering camphor, but the preparation contains so small a proportion of it, that of itself it could produce but little effect; it is therefore used as a vehicle for more active stimulants in low states of the system, and for antispasmodics in nervous and hysteric cases.

DOSE.—Half an ounce to two ounces.

CAMPHOR MIXTURE WITH MAGNESIA.

Take of Camphor, twelve grains,
Carbonate of Magnesia, half a drachm,
Water, six ounces.

Triturate the Camphor with the Magnesia, adding the water gradually, and mix.

REMARKS.—This formula is now introduced for the first time, and is peculiar to this Pharmacopœia; the magnesia renders the camphor more soluble. See remarks on *Camphor mixture*.

MEDICAL PROPERTIES AND USES.—In addition to the uses of the simple camphor mixture, this preparation has been found very beneficial in the uric acid diathesis, and also in irritations of the neck of the urinary bladder, particularly when given in combination with hyoscyamus.

DOSE.—Half an ounce to an ounce.

CHALK MIXTURE.

Take of Prepared Chalk, half an ounce,
Refined Sugar, three drachms,
Mucilage of Gum Arabic, an ounce,
Water, a pint.

Mix.

MEDICAL PROPERTIES AND USES.—This is a convenient form for the administration of chalk in diarrhoea, particularly if accompanied with acidity. It is also an excellent vehicle for opium or catechu, in similar affections.

DOSE.—One or two ounces.

COMPOUND MIXTURE OF IRON.

Take of Myrrh, reduced to fine powder, a drachm,
Carbonate of Potash, twenty-five grains,
Rose Water, seven ounces and a half,
Sulphate of Iron, reduced to powder, a scruple.
Spirit of Nutmeg, half an ounce,
Refined Sugar, a drachm.

Triturate together the Myrrh, Spirit of nutmeg, and Carbonate of potash, and during the trituration add to them, first the Rose water with the Sugar, then the Sulphate of iron. Pour the mixture immediately into a proper glass vessel, and stop it up.

REMARKS.—This preparation is very generally known by the name of *Griffith's mixture*: it is said to be better prepared by selecting a lump of fine myrrh of the proper weight, and triturating it in the first instance into a

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perfectly even emulsion with the rose water; then adding the spirit of nutmeg, carbonate of potash, and sugar; and lastly, dissolving in it the sulphate of iron.

It is one of those remedies which owe their efficacy to the chemical action and decomposition of their ingredients by each other; the sulphate of iron is decomposed by the carbonate of potash, forming by the interchange of constituents which takes place, sulphate of potash and proto-carbonate of iron, in which state the iron is more active than when it has become peroxide and more difficultly soluble; it is probably also less stimulant than the sulphate.

The carbonate thus formed is diffused through the water, and kept suspended* by means of the saponaceous compound formed by the union of the myrrh with the excess of alkali. The sulphate of potash is dissolved, and serves to correct the astringent influence of the iron.

When recently prepared this mixture is of a greenish colour, owing to the proto-carbonate of iron, which latter very rapidly absorbs oxygen from the air and becomes red oxide; it should therefore be kept perfectly excluded from the air; or what is still better, only prepared when wanted; for not only is its efficacy diminished by keeping, but from the different appearances which it presents according to the length of time it has been prepared, a patient might very naturally suppose that some mistake had been made in the preparation of the medicine.

MEDICAL PROPERTIES AND USES.—It is a very valuable tonic and emmenagogue, and may be used with advantage in hectic, in phthisis when no inflammatory diathesis exists, in hysteria and chlorosis. Dr. Paris says he has found it almost a specific in the painful

* According to Dr. Paris, it is *partly* diffused and suspended, and *partly* dissolved.—*Pharmacologia*, vol. ii. p. 327.

swellings of the breasts which sometimes affect chlorotic young women: if it feel cold in the stomach an additional drachm of spirit of nutmeg may be added to each dose with advantage.

DOSE.—One or two ounces.

AROMATIC MIXTURE OF IRON.

Take of Lance-leaved Cinchona, reduced to coarse powder, an ounce,
Colomba Root, sliced, three drachms,
Cloves bruised, two drachms.
Iron Filings, half an ounce.

Digest for three days in a closed vessel, shaking occasionally, with as much peppermint water as will be sufficient, to afford twelve ounces of strained liquor, then add

Compound Tincture of Cardamoms, three ounces,
Tincture of Orange Peel, three drachms.

REMARKS.—This is a very old preparation, now for the first time introduced into this Pharmacopœia, and not ordered by the other Colleges. It was formerly much extolled, and known in practice by the name of *Heberden's Ink*, from its colour, which is black, owing to the chemical action of the bark on the iron.

MEDICAL PROPERTIES AND USES.—It is a most valuable tonic medicine in weak states of the stomach, arising from dyspepsia, and in various states of debility.

DOSE.—Half an ounce to two ounces.

MUCILAGES.

The term mucilage, in pharmacy, is applied to solutions of gummy matter in water, sufficiently concentrated to have a degree of viscosity; or to similar solutions obtained by macerating in water, vegetables in which this kind of matter abounds. They are principally employed as vehicles for other substances; to suspend powders in liquids, to diffuse oils or resinous matter in water, or to give form and tenacity to pills. Different substances require different proportions of mucilage to render them miscible with aqueous vehicles. *Oils* will require about three-fourths of their weight, *balsams* and *spermaceti* equal parts, *resins* two parts, and *musk* five times its weight.

MUCILAGE OF STARCH.

Take of Starch, six drachms,
Water, a pint.

Triturate the starch, gradually adding the water, then boil for a short time.

MEDICAL PROPERTIES AND USES.—This preparation of starch is only used as a vehicle for the administration of more active substances, in the form of enemata, particularly opium. See Remarks, p. 624.

MUCILAGE OF GUM ARABIC.

Take of Gum Arabic, reduced to coarse powder,
four ounces,
Hot Water, *by measure*, four ounces.

Digest, shaking frequently, that the gum may be dissolved, then strain the mucilage through linen.

REMARKS.—The proportion of gum here ordered to be dissolved in four ounces of water is twice too great, being quite sufficient for eight ounces, as directed by the London College; when of the consistence ordered in the above formula it could not be strained, which is very necessary, in order to free it from small particles of wood and other impurities; this trouble may be saved, and a much finer mucilage obtained, by adopting the process recommended by Dr. Duncan; which is to suspend the pieces of gum entire, tied up in a muslin rag and merely immersed in water; as fast as it dissolves the heavy mucilage sinks to the bottom, and fresh water comes in contact with the gum until the whole is dissolved: the gum being so easily altered by heat, that it is changed even by boiling water being poured on it; and by being powdered, in consequence of which the mucilage prepared according to the direction of the colleges, is always more or less turbid, and if the gum arabic be adulterated with cherry tree gum, as it sometimes is, the solution will be ropy in consequence of the presence of *Cerasin*.

MEDICAL PROPERTIES AND USES.—It is demulcent, and is a good adjunct in cough mixtures: it is also a useful addition to diluent drinks in affections of the bladder. It is pharmaceutically used for the purposes already mentioned, under the head *Mucilages*, p. 654.

MUCILAGE OF GUM TRAGACANTH.

Take of Gum Tragacanth, in powder, two drachms,
Water, *by measure*, eight ounces.

Macerate in a close vessel until the gum is dissolved; then strain the mucilage.

REMARKS.—The solution of this gum is effected with difficulty, and may be assisted by first beating the gum into a paste with a little water, and then gradually adding to it the rest of the water.

Gum tragacanth differs from all other gums in giving a thick consistence to a larger quantity of water, its power in this respect being to that of gum arabic as twenty to one; one part of it converting twenty of hot water into a stiff mucilage; its solubility is not increased, but actually diminished by the addition of any other gum.

MEDICAL PROPERTIES AND USES.—It serves many of the purposes for which mucilage of gum arabic is used; its principal use is for the formation of pills and troches. It has been recommended by M. Blaire, a French surgeon, as a remedy in burns.

CAMPHORATED OIL.

Take of Camphor, a drachm,
Olive Oil, an ounce.

Rub them together until the camphor is dissolved, then strain.

MEDICAL PROPERTIES AND USES.—This is a very convenient form for the application of camphor to glandular swellings, sprains, bruises, and to parts affected with rheumatic pains. Mr. Ware recommends its application, with the addition of carbonate of potash, to the eyelids, night and morning, in cases of incipient amaurosis.

POWDER FOR A CATAPLASM.

Take of Linseed, which remains after the expression
of the oil, one part,
Oatmeal, two parts.

Mix.

REMARKS.—This does not appear to be a very necessary formula, and certainly directs for use the very worst kind of linseed meal for making a poultice. See remarks, p. 328. Its uses have been already sufficiently mentioned, p. 602.

SECTION XI.

MISCELLANEOUS PREPARATIONS.

AROMATIC SULPHURIC ACID.

Take of Rectified Spirit, two pints,
Sulphuric Acid, *by weight*, six ounces.

Add the acid to the spirit gradually: digest the mixture in a closed vessel with an inferior heat, for three days; then add, of

Cinnamon bark, bruised, an ounce and a
half,
Ginger Root, bruised, an ounce.

Digest the mixture again for six days; and lastly, filter through paper placed in a glass funnel.

REMARKS.—This preparation is now introduced into this Pharmacopœia for the first time, from that of the

Edinburgh College: it is the *Tinctura aromatica cum acido sulphurico* of the French codex; and is very generally known by the name of *Acid Elixir of Vitriol*.

By some it is regarded as an imperfect Ether; which, however, there is more reason to believe is not the case, but that it is a simple alcoholic solution of sulphuric acid, holding in solution the essential oils of cinnamon and ginger; Dr. Duncan having by repeated experiments with Mr. Ker's ingenious bent tubes, ascertained that there is no re-action upon the sulphuric acid; at least, that not a particle of gas is evolved by the mixture of alcohol and sulphuric acid in the proportions indicated: see his Supplement, p. 175. Its odour is peculiar and aromatic: it is limpid, of a brownish colour, and has a gratefully acid taste.

MEDICAL PROPERTIES AND USES.—It is tonic and stimulant; and is an agreeable form for the administration of sulphuric acid in dyspepsia, chronic asthma, hæmoptysis, and in the various other affections in which dilute sulphuric acid has been found useful: and benefit has been derived from its use when bitters and aromatics have failed.

It is sometimes given in conjunction with cinchona and other tonic barks, a combination which is found extremely useful, probably from the acid uniting with the salifiable bases *cinchonine* and *quinine*, and rendering them more soluble, and consequently more active.

DOSE.—Ten drops to thirty in a wine glass of water.

CHLORINE WATER.

Take of Dried Muriate of Soda, one hundred parts,
Oxide of Manganese, thirty parts,
Sulphuric Acid, eighty-seven parts,
Water, one hundred and twenty-four parts.

Add the acid gradually to the water, and when the mixture has grown cold pour it on the muriate of soda and oxide of manganese, both having been previously reduced to fine powder, well mixed and put into a retort: then with a proper apparatus and a moderate heat gradually increased, let the gas escaping from the mixture be transmitted through two hundred parts of distilled water, the operation being concluded as soon as the effervescence in the retort has subsided.

Chlorine water should be kept in well stopped glass bottles, and in a place impervious to the rays of the sun.

REMARKS.—In the former edition of this Pharmacopœia, this preparation was ordered under an old and erroneous title, *Aqua oxymuriatica*, and its specific gravity is there stated to be 1003, distilled water being 1000.

On mixing the ingredients as above directed, the sulphuric acid combining with the soda disengages the muriatic acid, between which and the oxide of manganese there takes place, a mutual re-action and decomposition, by which the hydrogen of the muriatic acid unites to one portion of the oxygen of the manganese, and forms water, while the other constituent of the acid, the chlorine, is set at liberty, and on the application of heat passes off in the form of vapour or gas, which is condensed and rapidly absorbed by the water.

A. Woolfe's apparatus is the one best adapted to this process.

At a temperature of 50° water absorbs twice its volume of the gas, and forms in consequence a fluid of a yellowish green colour, having a harsh styptic taste, and the peculiarly suffocating odour of chlorine. It destroys all the vegetable colours, and renders them white. It must be kept in opaque bottles, and not exposed to the

light, for by the action of the solar rays part of the water is decomposed; and its hydrogen uniting with the chlorine forms muriatic acid, which remains in solution in the water, while the oxygen is set free.

The substance contained in this solution was discovered by Scheele in 1774, while making his experiments on manganese, and named by him *dephlogisticated muriatic acid*; but its nature was not perfectly understood until it was investigated by Sir H. Davy, who determined it to be an elementary substance, and named it *Chlorine*, from its colour, which is greenish yellow.

MEDICAL PROPERTIES AND USES.—It is stimulant and antiseptic, and has been strongly recommended in scarlatina and malignant sore throat. The virtues of chlorine have been lately much insisted upon by Professor Brugnatelli of Pavia, as a remedy for hydrophobia; and in answer to the objections of Professor Valetta of Milan, he has brought forward various authenticated facts to establish what he calls the *specific* powers of chlorine.

The most important use of chlorine is in its gaseous form, as a fumigation for neutralizing putrid miasmata, and correcting the infectious atmosphere of hospital wards, and rooms in which there have been cases of infectious fevers; for which purpose it may be disengaged abundantly by mixing together the ingredients here ordered, in earthen pipkins, placed in hot sand over some coals; these should be distributed in the apartment to be fumigated, and the doors and windows closed for some hours, after which the air should be freely admitted, and thorough ventilation established to remove the vapours of the chlorine.

The chloride of lime, or the bleaching salt, and the chloride of soda, have latterly been much brought into notice as disinfecting agents, and for the purpose of decomposing or neutralizing hurtful emanations. The

solution of the latter salt is known in France by the name of the *Liqueur disinfectante de M. Labarraque*.

Dr. Reid, of this city, has published some cases* in which he used a solution of the chloride of lime in low fever and in dysentery, with advantage.

DOSE.—One to two drachms.

TINCTURE OF IODINE.

Take of Iodine, two scruples,
Rectified Spirit, an ounce.

Mix and dissolve the Iodine by heat; keep the mixture in a well closed vessel.

REMARKS.—Iodine, the active constituent of this tincture, is now, for the first time, introduced into this Pharmacopœia, and has not as yet received the sanction of the other colleges. Care should be taken that the Iodine used in making this tincture should be well dried, so as to free it from the water with which it is generally combined in a large proportion, see p. 575, and which would tend to cause the decomposition of the preparation, and prevent its keeping: for a like reason it ought not to be too long prepared before it is wanted, or in large quantities, and the access of air ought to be as far as possible prevented, otherwise it deposits crystals of iodine; and besides, the iodine may attract a portion of the hydrogen of the spirit, and become converted into an ioduretted hydriodic acid.

* Trans. Assoc. Coll. Phys. vol. v. see also “An Essay on the Use of the Chlorurets of the Oxide of Sodium and of Lime, as powerful disinfecting agents; and of the chloruret of oxide of sodium, more especially as a remedy of considerable efficacy in the treatment of hospital gangrene, phagedenic, syphilitic, and ill-conditioned ulcers, mortification, and various other diseases.” By M. Alcock, Lond. 1827.

According to Magendie, a drop of this tincture weighs only two-thirds of a grain ; whereas a drop of the solution of the hydriodate of potash weighs more than a grain, even a grain and a half, or two grains if the solution be ioduretted. This difference, therefore, must be borne in mind when the doses are regulated by drops.

MEDICAL PROPERTIES AND USES.—Same as those of iodine which have been already detailed, p. 575, et seq. It is administered internally, and externally applied in the form of liniment, which is best done by combining one or two drachms of it with an ounce of the anodyne liniment, or with soap liniment.

Each drachm of the tincture contains five grains of iodine.

DOSE.—From five drops to twenty, three times a day.

HYDRIODATE OF POTASH.

Take of Iodine, one part,
 Sulphuret of Iron, reduced to coarse powder, five parts,
 Sulphuric Acid, seven parts,
 Distilled Water, forty-eight parts,
 Water of Carbonate of Potash, a sufficient quantity.
 Rectified spirit, six parts.

Mix the Iodine by trituration with sixteen parts of the water, and put the mixture into a glass vessel. Pour the acid previously diluted with thirty-two parts of water, upon the sulphuret in a matrass, and from a tube adapted to the neck of the matrass, and reaching to the bottom of the vessel containing the iodine and water, let the gas pass through the mixture until the Iodine disappears. Having filtered the liquor evaporate it without delay by a superior heat, to one-eighth part,

and then filter it again. Then add gradually as much water of carbonate of potash as will be sufficient to saturate the acid, which is known by the cessation of the effervescence. Then expose the mixture to heat until the residual salt is dry and of a white colour; on this pour the spirit, and dissolve it with heat. Lastly, evaporate to dryness the liquor poured off from the residual salt, and preserve the residuum in a well stopped vessel.

REMARKS.—This salt is now, for the first time, introduced into this Pharmacopœia, and is not ordered by the other colleges.

The changes which take place by the operations directed are these: by the action of the dilute sulphuric acid on the sulphuret of iron, sulphuretted hydrogen is disengaged, and this being made to pass through the solution of iodine in water, the iodine continues to unite with the hydrogen until it is all taken up, which is known by the mixture losing its brown colour; thus by the union of the iodine and hydrogen, *hydriodic acid* is produced, and afterwards neutralized by a sufficient quantity of water of carbonate of potash. The hydriodic acid unites to the potash, and forms with it *Hydriodate of potash*, the salt required, which however exists only in the solution, for when dried it is converted into *Iodide of potassium*.

Another process has been recommended by Dr. Turner, which has the advantage of not requiring the previous formation of hydriodic acid, which is a matter of great convenience in preparing large quantities of the salt. The process consists in adding to a hot solution of pure potash as much iodine as it is capable of dissolving, by which means a deep brownish red coloured fluid is formed, consisting of the iodate and hydriodate of potash, together with a large excess of free iodine. Through this solution a current of sulphuretted hydro-

gen gas is transmitted, until the free iodine and iodic acid are converted into hydriodic acid; changes which may be known to be accomplished by the liquid becoming quite limpid and colourless. The solution is then gently heated, to expel any excess of sulphuretted hydrogen, and after being filtered, the pure hydriodic acid is exactly neutralized by pure potash.

A still easier process consists in adding iodine to a solution of sulphuret of potash, until the potash is exactly neutralized. The hydriodate is then formed at once, without the necessity of a current of sulphuretted hydrogen gas.

According to Chevallier, the following process of MM. Baup and Caillot gives a finer product than any other. Introduce into a matrass fifty parts of distilled water and ten parts of iodine: add to these gradually five parts of pure iron filings, shaking the matrass on each addition, then heat it gently, stirring from time to time; the iodine unites to the iron and forms an ioduretted hydriodate of iron, which by the action of heat is converted into a simple hydriodate, which is known by the liquor becoming colourless and ceasing to impart a reddish brown colour to white paper dipped into it. The liquor is then filtered, diluted with several parts of water, and placed upon a sand-bath in a capsule or matrass, till it approaches the boiling point, when it must be saturated with carbonate of potash and the iron precipitated; filter the liquor to separate the iron, wash the filter repeatedly, and mix all the liquors; if there be any excess of the base, it must be saturated with hydriodic acid, and the liquor evaporated in a porcelain capsule: by degrees the crystals are deposited on the sides of the vessel; these must be afterwards washed with water and dried; if not sufficiently white they must be re-dissolved, the solution filtered, and again crystallized. *Dict. des Drogues, Simp. et Comp.* tom. iii. pp. 179-80.

PROPERTIES AND TESTS OF ITS PURITY.—The hydriodate of potash generally crystallizes in cubes, but by careful evaporation it may be obtained in pyramids: it is of an opaque milky white. It is soluble in water; 100 parts of which, at 53° according to M. Baup, dissolve 136 of the salt, and 141 parts at 60° . It is dissolved freely by alcohol, and when a saturated hot alcoholic solution is set aside to cool, iodide of potassium is deposited in cubic crystals: a solution of hydriodate of potash is capable of dissolving a large quantity of iodine, a property common to all the hydriodates. Its composition is, hydriodic acid 100, potash 37.426. It is deliquescent. By crystallization or dessication it is converted into *Iodide of potassium*.

The high price of the preparations of iodine has led to their adulteration by admixture with some of the hydro-chlorates. M. Robiquet has pointed out the following method for ascertaining the purity of these salts: take any weight of pure hydriodate of potash, and an equal quantity of the suspected article; dissolve them separately in equal quantities of water: introduce the solutions into small tubulated retorts; adapt receivers to these, and pour into the retorts nitric acid in excess, so as completely to decompose the hydriodate; the nitric acid and potash combine, and the iodine is set at liberty and volatilized by the application of heat, which should be increased so as to dissipate the whole of the iodine; the residuum of each is collected, dried, and weighed, and the degree of its purity thence inferred. Then the distilled liquors are tested by means of nitrate of silver; the liquor obtained from the pure sample ought to give no precipitate, whilst that obtained from the sample adulterated with a hydro-chlorate, does: and the quantity of chloride of silver is in proportion to the impurity of the hydriodate under examination.

MEDICAL PROPERTIES AND USES.—These are si-

milar to those of iodine, which have been already detailed at p. 575, et seq. The hydriodate is chiefly used as an external application in the form of ointment, as directed p. 579, which see: it is however used internally also in the form of solution, made by dissolving thirty-six grains of the salt in an ounce of distilled water. Of the extraordinary success of this remedy, very extravagant accounts have been given; among the rest two cases are mentioned by Magendie, as occurring in the hospital of La Salpêtrière, in which it completely cured cancer of the tongue which had existed for many years!

I am informed by my friend Dr. De Renzy, of Carnew, that he has found such a solution act almost as a specific in the cure of hæmoptysis, and I have already at p. 576, adverted to a case since published in full,* in which the use of iodine appeared decidedly to restrain uterine hæmorrhage: those facts would induce us to receive the theory, that the remedy acts “by constringing the ultimate ramifications of the vascular system.” It has also succeeded under the management of Dr. Graves, in curing that very troublesome and unmanageable swelling of the hand, described by him under the name of recurrent erythema.

DOSE.—One to three grains of the salt, or from five drops to twenty of the solution.

SULPHATE OF QUININE.

Take of Yellow Bark, coarsely powdered, four pounds,
Distilled Water, eight pints,
Dilute Sulphuric Acid, two ounces.

Mix, and digest them for four hours in a proper vessel with a superior heat, frequently shaking, then strain:

* See Dublin Hospital Reports, vol. v. p. 427.

mix again what remains of the bark with a like quantity of water, and strain, and do so a third time: having mixed the liquors, add to them as much fresh burnt and slacked lime as will be sufficient to saturate the acid: by means of a paper filter separate the precipitate, to this add three pints of rectified spirit, digest them together for six hours, frequently shaking, and filter: digest again the residual powder with an equal quantity of rectified spirit, and filter. Do this a third time. Having mixed the spirituous liquors, evaporate almost to dryness in a water bath. To the residuum, add by degrees as much dilute sulphuric acid as will make the acid slightly in excess in the liquor; then by evaporation and cooling, let crystals form.

REMARKS.—In the process above directed the following changes take place: by digesting together the bark, and water acidulated with sulphuric acid, the quinine of the bark is dissolved, and taken up completely by the repeated washings of the bark, and exists in the liquors in the form of sulphate of quinine: upon the addition of the lime the sulphuric acid unites to it, forming sulphate of lime, which is precipitated together with the quinine: the compound precipitated thus formed, is then digested repeatedly with rectified spirit, which dissolves the quinine, but leaves the sulphate of lime behind. After the evaporation of the spirit, dilute sulphuric acid is added to the residuum which is quinine, and the sulphate of quinine is thus obtained and allowed to crystallize.

The product obtained by this process is not as white as it ought to be; a defect which might be obviated by adding to the liquors some animal charcoal. Two pounds of bark yield about five or six drachms of sulphate of quinine.

As the process is an expensive one, care should be

taken to collect the whole product with as little loss as possible; we are therefore recommended to preserve the papers and filters used in the operation, which contain a good deal of sulphate of quinine, which may be obtained from them by washing with acidulated water and precipitating with lime: instead of evaporating the rectified spirit, M. Henry separates it by distillation, and makes it serve for another operation: * we may also use the residua which remaining after making some of the other preparations of bark, as the infusion, decoction, &c., and it is said that the proportion of product which may be obtained from the bark after making the decoction, is as two to three.

PROPERTIES AND TESTS OF ITS PURITY.—It has been found that *Quinine* will unite with sulphuric acid in two proportions, and thus produce two salts distinct both in their crystalline form and solubility. The *neutral sulphate* is white, in silky needles, sparingly soluble in cold water, more soluble in boiling water, completely so in alcohol and in water acidulated with sulphuric acid, phosphorescent at a temperature of 212° . The *acid sulphate* is more soluble in water, assumes the form of needle-shaped prisms of a greater size than those of the neutral salt. M. Robiquet has stated the composition of these two salts to be,

Neutral Sulphate.		Acid Sulphate.	
Sulphuric Acid,	10		19 . 1
Quinine,	80 . 9		63 . 5
Water,	9 . 1		17 . 4
	<hr/>		<hr/>
	100 . 0		100 . 0

The high price of sulphate of quinine has given rise

* Some experiments were made by MM. Guilbert, Henry, and Cassola, to ascertain whether they might not dispense with the alcohol altogether as a matter of economy; the results were not satisfactory.

to a great number of adulterations, as with boracic acid, sulphate of lime, sugar, mannite, stearine, starch, and sometimes it contains too large a proportion of water, which increases its weight.

Sulphate of lime may be detected by heating the sample with alcohol, which will dissolve the sulphate of quinine, and leave the sulphate of lime behind.

The presence of *Sugar or Mannite* may be ascertained by solution in water, and precipitating the quinine by carbonate of potash, then filter and evaporate the liquor from which the quinine has been separated; treat the residuum with alcohol, which will dissolve any sugar or mannite that may be present.

Stearine may be detected by dissolving the sulphate in water acidulated with sulphuric acid, when the stearine, if present, will remain undissolved.

The presence of *Starch* may be known by dissolving the sample in alcohol, which will dissolve the sulphate and leave the starch behind, and its presence will be proved by bringing it into contact with a solution of iodine.

If *Boracic Acid* be present, an alcoholic solution of the sulphate will burn with a green flame.

With regard to the presence of too much water, samples are said to have been met with, in which it existed to the amount of forty parts in a hundred; whereas, when properly prepared, sulphate of quinine ought not to lose more than from eight to ten parts in a hundred by dessication.*

In addition to the above, the following tests of its purity are given by Dr. Barker in the Paper already quoted: when exposed to heat on a slip of platina foil it

* Journ. de Chimie Med. tom. iv. p. 332. Journ. de Pharm. Juin 1826, p. 319, where M. Robiquet mentions that sulphate of lime is prepared in Paris in acicular crystals, expressly for the purpose of adulterating sulphate of quinine.

melts like wax, it then blackens, partly rises, and burns with flame. It requires at least 300 times its weight of water for solution; much more of it is taken up by hot than by cold water, from which it crystallizes in prisms: it dissolves in a quantity of rectified spirit, of spec. grav. 840, amounting to about 40 times its weight. Its aqueous solution is rendered turbid by barytic salts, but the most striking effect is produced by *Iodine*, a grain of which heated in a drachm or two of water produces in the watery solution of sulphate of quinine a copious precipitate, of a cinnamon brown colour. This precipitate dissolves on heating the liquor: it is also soluble in rectified spirit, and is again thrown down by water.

The tincture of Iodine may be also applied as a test; this tincture is partly decomposed by water, but the colour of the precipitate is quite different from that produced by the sulphate of quinine, which in colour very much resembles the Peruvian bark.

To these may be added its sensible qualities, particularly its strong bitter taste, which, if found to co-exist with the above mentioned chemical properties, will prove the substance to be genuine.

MEDICAL PROPERTIES AND USES.—Sulphate of quinine is one of the most valuable tonic and febrifuge medicines at present known: it would not be possible to give here an account of all its applications in medicine: but some of the most interesting may be mentioned.

It has been found one of the most certain and expeditious means of curing intermittent fever: see a highly interesting paper on the subject by Dr. Barker, in vol. iv. of the Trans. Assoc. Coll. Phys. in Ireland, p. 261. It has been used with the most decided benefit in the treatment of acute rheumatism, proper attention having been first paid to the state of the bowels. I have found it act almost as a specific in the cure of infantile erysipelas. It has been used with advantage in some cases of tic douloureux, and in intermittent headach.

A very curious fact with regard to this substance has been noticed by Dr. Harty, in a Paper published in the Edin. Med. and Surg. Journ. for October 1829; from his observations and cases it appears, that sulphate of quinine possesses the power of rendering the system more susceptible of the influence of mercury, so as to induce the specific action of that remedy in a much shorter time, and with a much smaller quantity of mercury.

It may be given in the solid form in pills, combined with extract of gentian, see p. 497, or to children as a powder rubbed up with white sugar. If given in the liquid form it may be dissolved in water, by adding a drop of dilute sulphuric acid for every grain of the sulphate. The water used should be distilled.

DOSE.—One to five grains.

A grain is considered as equivalent to a drachm of bark.

TINCTURE OF BUCHU.

Take of the Leaves of the *Diosma crenata*, two ounces,

Proof Spirit, a pint.

Macerate for seven days and filter.

See Remarks, pp. 633-4.

DOSE.—One drachm to three or four.

TINCTURE OF THE ACETATE OF IRON WITH ALCOHOL.

Take of Sulphate of Iron,

Acetate of Potash, of each an ounce,

Alcohol, two pints.

Triturate together the acetate of potash and sulphate of iron in an earthenware mortar, until they unite and form a soft mass; then dry with a medium heat, and as soon as it has grown cold triturate it with the alcohol: put the mixture into a well stopped phial, and digest for twenty-four hours, shaking occasionally; lastly, pour off the clear tincture from the dregs, and keep it in a well stopped vessel.

REMARKS.—In another part of this Pharmacopœia, a *Tincture of the acetate of iron* is ordered, and its composition, &c., so fully explained by Dr. Barker in his remarks on the formula, see p. 258, et seq., that it does not appear necessary here to add any thing to the explanation already given, the theory of the formation of the acetate of iron being the same in both cases: alcohol is used in this preparation instead of rectified spirit; by which a stronger tincture is obtained, and the preparation rendered less liable to spontaneous decomposition.

Mr. M'Kenna, of Apothecaries' Hall, has found the following process successful in producing a good and permanent tincture of the acetate of iron: the sulphate of iron in powder is to be well dried in the heat of a water bath, and well mixed with the acetate of potash; then a small quantity of spirit is to be added so as to form a paste. The trituration is to be continued until the mass assume a dark brown colour. The remainder of the spirit being then added, the whole is to be allowed to rest, and the clear solution decanted. According to his observations, the solution should not be allowed to remain many days in contact with the fæces, as in that case it becomes turbid, and even filtration will not restore its transparency.—*Annals of Pharmacy*, vol. i. p. 387.

MEDICAL PROPERTIES AND USES.—For these see p. 260.

DOSE.—From twenty drops to a drachm.

A TABLE,

SHEWING THE QUANTITY OF IODINE, OPIUM, ARSENIC, ANTIMONY, AND MERCURY, IN CERTAIN COMPOUND MEDICINES.

A drachm, *by measure*, OF TINCTURE OF IODINE contains five grains of iodine.

COMPOUND POWDER OF IPECACUAN in ten grains contains one grain of Opium.

A scruple of the COMPOUND POWDER OF KINO contains one grain of Opium.

Each drachm of VINEGAR OF OPIUM, as appears by evaporation, contains seven grains and half of the Extract, and twenty drops of the Vinegar of Opium, have the same strength as thirty drops of the Tincture.

The CONFECTION OF OPIUM in about twenty-five grains, contains one grain of Opium.

TINCTURE OF OPIUM, in the measure of a drachm, contains about four grains and half of Opium.

CAMPHORATED TINCTURE OF OPIUM, OR PAREGORIC ELIXIR, in the measure of four drachms and half, contains one grain of Opium, nearly.

COMPOUND ELECTUARY OF CATECHU, in each ounce contains two grains and half of Opium.

PILLS OF SOAP WITH OPIUM, in five grains, contain one grain of Opium.

STORAX PILLS, in five grains, contain one grain of Opium.

Of the COMPOUND POWDER OF CHALK WITH OPIUM, two scruples contain about one grain of Opium.

The LIQUOR ARSENICALIS, in the measure of one drachm, contains about half a grain of the White Oxide of Arsenic.

The SOLUTION OF TARTAR EMETIC, in each ounce contains two grains of Tartar Emetic.

The PILULÆ HYDRARGYRI, in six grains contain two grains of Mercury.

Of the MERCURY WITH MAGNESIA, and MERCURY WITH CHALK respectively, five grains contain two grains of Mercury.*

The COMPOUND CALOMEL PILLS, in five or six grains, contain one grain of Calomel and one grain of the Brown Antimoniated Sulphur.

The STRONGER MERCURIAL OINTMENT, in two drachms contains one drachm of Mercury.

The Milder MERCURIAL OINTMENT, in two drachms contains half a drachm of mercury.

The OINTMENT OF THE NITRIC OXIDE OF MERCURY, in each drachm contains about six grains and half of the Nitric Oxide of Mercury.

The OINTMENT OF THE AMMONIATED SUBMURIATE OF MERCURY, in each drachm contains about five grains of the Ammoniated Submuriate of Mercury.

The OINTMENT OF THE NITRATE OF MERCURY, in each drachm contains about three grains of Mercury.

* This is incorrect, as the whole of the manna is got rid of in the process ; so that *three* grains of the preparation contain two of mercury.

INDEXES

OF THE

NAMES WHICH HAVE BEEN CHANGED,

OF THE FOLLOWING INDEXES, THE FIRST, MARKED WITH THE LETTER A, EXHIBITS THE CHANGED NAMES:

THE SECOND, MARKED WITH THE LETTER B, EXHIBITS THE NEW NAMES, ARRANGED IN ALPHABETICAL ORDER.

INDEX A.

CHANGED NAMES

OF THE

Dublin Pharmacopœia, 1807.

NEW NAMES

OF THE

Dublin Pharmacopœia, 1826.

<i>Acetas Kali.</i>	<i>Potassæ Acetas.</i>
<i>Acidum Nitrosum.</i>	<i>Acidum nitricum.</i>
<i>Acidum nitrosum dilutum.</i>	<i>Acidum nitricum dilutum.</i>
<i>Ærugo præparata.</i>	<i>Cupri Subacetas præparatum.</i>
<i>Alumen ustum.</i>	<i>Alumen siccatum.</i>
<i>Aqua Fœniculi dulcis.</i>	<i>Aqua Fœniculi.</i>
<i>Aqua Kali caustici.</i>	<i>Potassæ causticæ aqua.</i>
<i>Aqua Menthæ sativæ.</i>	<i>Aqua Menthæ viridis.</i>
<i>Aqua Oxymuriatica.</i>	<i>Aqua Chlorinii.</i>
<i>Aqua Subcarbonatis Kali.</i>	<i>Potassæ Carbonatis aqua.</i>
<i>Aqua Sulphureti Ammoniæ.</i>	<i>Ammoniæ Hydrosulphuretum.</i>
<i>Aqua Sulphureti Kali.</i>	<i>Potassæ Sulphureti Aqua.</i>

<i>Creta præcipitata.</i>	Calcis Carbonas præcipitatum.
<i>Elaterium.</i>	Extractum Elaterii.
<i>Genista.</i>	Spartium Scoparium.
<i>Infusum Cinchonæ sine ca-</i> <i>lore.</i>	Infusum Cinchonæ.
<i>Infusum Rosæ.</i>	Infusum Rosæ acidum.
<i>Infusum Sennæ.</i>	Infusum Sennæ compositum.
<i>Kali causticum.</i>	Potassa caustica.
<i>Kali causticum cum Calce.</i>	Potassa caustica cum Calce.
<i>Kali e Tartaro.</i>	Potassæ Carbonas e Tartari Crystallis.
<i>Lac Ammoniaci.</i>	Mistura Ammoniaci.
<i>Lac Amygdalæ.</i>	Mistura Amygdalarum.
<i>Lac Assæfætidæ.</i>	Mistura Assæfætidæ.
<i>Lapis Calaminaris præpara-</i> <i>tus.</i>	Zinci Carbonas impurum præpa- ratum.
<i>Liquor Subacetatis Lithar-</i> <i>gyri.</i>	Plumbi Subacetatis liquor.
<i>Liquor Subacetatis Lithargyri</i> <i>compositus.</i>	Plumbi Subacetatis liquor com- positus.
<i>Magnesia.</i>	Magnesiae Carbonas.
<i>Magnesia usta.</i>	Magnesia.
<i>Mentha sativa.</i>	Mentha viridis.
<i>Oxydum Hydrargyri.</i>	Oxydum Hydrargyri rubrum.
<i>Oxymel Æruginis.</i>	Oxymel Cupri Subacetatis.
<i>Pilulæ Myrrhæ compositæ.</i>	Pilulæ Galbani compositæ.
<i>Pilulæ Scillæ cum Zingibere.</i>	Pilulæ Scillæ compositæ.
<i>Pulvis Aloës cum Guaiaco.</i>	Pulvis Aloës compositus.
<i>Spiritus Camphoratus.</i>	Tinctura Camphoræ.
<i>Spiritus Pimento.</i>	Spiritus Pimentæ.
<i>Spiritus Raphani compositus.</i>	Spiritus Armoraciæ compositus.
<i>Subcarbonas Kali.</i>	Potassæ Carbonas e Lixivo Cinere.
<i>Submuriâs Hydrargyri præci-</i> <i>pitatum.</i>	Calomelas præcipitatum.

<i>Submuriæ Hydrargyri sublimatum.</i>	Calomelas sublimatum.
<i>Succus spissatus Cicutæ.</i>	Succus spissatus Conii.
<i>Sulphas Kali.</i>	Potassæ Sulphas.
<i>Sulphur sublimatum lotum.</i>	Sulphur lotum.
<i>Sulphuretum Kali.</i>	Potassæ Sulphuretum.
<i>Syrupus Papaveris albi.</i>	Syrupus Papaveris somniferi.
<i>Syrupus Papaveris erratici.</i>	Syrupus Papaveris Rhœadis.
<i>Tartarum Antimoniatum sive emeticum.</i>	Antimonii et Potassæ Tartras sive Tartarum emeticum.
<i>Tartaras Kali.</i>	Potassæ Tartras.
<i>Tartaras Sodæ et Kali.</i>	Sodæ et Potassæ Tartras.
<i>Tinctura Colombo.</i>	Tinctura Colombæ.
<i>Tinctura Muriatis Ferri.</i>	Muriatis Ferri liquor.
<i>Tinctura Sennæ.</i>	Tinctura Sennæ composita.
<i>Unguentum Acidi nitrosi.</i>	Unguentum Acidi nitrici.
<i>Unguentum Æruginis.</i>	Unguentum Cupri Subacetatis.
<i>Unguentum Calaminaris.</i>	Unguentum Calaminæ.
<i>Unguentum Cerussæ.</i>	Unguentum Plumbi Carbonatis.
<i>Unguentum Spermatæ Ceti.</i>	Unguentum Cetacei.
<i>Unguentum Subnitratæ Hydrargyri.</i>	Unguentum Hydrargyri Oxydi nitrici.
<i>Unguentum Supernitratæ Hydrargyri.</i>	Unguentum Hydrargyri nitratis vel Unguentum citrinum.

INDEX B.

OF

CHANGED NAMES.

NEW NAMES

OF THE

Dublin Pharmacopœia, 1826.

Acidum Nitricum.
Acidum Nitricum Dilutum.
Alumen siccatum.
Ammoniæ Hydrosulphuretum.
Antimonii et Potassæ Tartras
sive Tartarum Emeticum.
Aqua Chlorinii.
Aqua Fæniculi.
Aqua Menthæ viridis.
Calcis Carbonas præcipitatum.
Calomelas præcipitatum.

Calomelas sublimatum.

Cupri Subacetas præcipitatum.
Extractum Elaterii.
Infusum Cinchonæ.
Infusum Rosæ acidum.

CHANGED NAMES

OF THE

Dublin Pharmacopœia, 1807.

Acidum Nitrosum.
Acidum Nitrosum dilutum.
Alumen ustum.
Aqua Sulphureti ammoniæ.
Tartarum Antimoniatum sive
emeticum.
Aqua Oxymuriatica.
Aqua Fæniculi dulcis.
Aqua Menthæ Sativæ.
Creta præcipitata.
Submurias Hydrargyri præci-
pitatum.
Submurias Hydrargyri subli-
matum.

Ærugo præparata.
Elaterium.
Infusum Cinchonæ sine Calore.
Infusum Rosæ.

Infusum Sennæ compositum.	<i>Infusum Sennæ.</i>
Magnesiae Carbonas.	<i>Magnesia.</i>
Magnesia.	<i>Magnesia usta.</i>
Mentha viridis.	<i>Mentha sativa.</i>
Mistura Ammoniaci.	<i>Lac Ammoniaci.</i>
Mistura Amygdalarum.	<i>Lac Amygdalæ.</i>
Mistura Assæfœtidæ.	<i>Lac Assæfœtidæ.</i>
Oxydum Hydrargyri rubrum.	<i>Oxydum Hydrargyri.</i>
Oxymel Cupri Subacetatis.	<i>Oxymel Æruginis.</i>
Pilulæ Galbani compositæ.	<i>Pilulæ Myrrhæ compositæ.</i>
Pilulæ Scillæ compositæ.	<i>Pilulæ Scillæ cum Zingibere.</i>
Plumbi Subacetatis Liquor.	<i>Liquor Subacetatis Lithargyri.</i>
Plumbi Subacetatis Liquor compositus.	<i>Liquor Subacetatis Lithargyri compositus.</i>
Potassæ Acetas.	<i>Acetas Kali.</i>
Potassæ Carbonatis aqua.	<i>Aqua Subcarbonatis Kali.</i>
Potassæ Carbonas e Tartari Crystallis.	<i>Potassæ Subcarbonas.</i>
Potassa Caustica.	<i>Kali causticum.</i>
Potassa Caustica cum calce.	<i>Kali causticum cum calce.</i>
Pulvis Aloës compositus.	<i>Pulvis Aloës cum Guaiaco.</i>
Sodæ et Potassæ Tartras.	<i>Tartaras Sodæ et Kali.</i>
Spartium Scoparium.	<i>Genista.</i>
Spiritus Armoraciæ compositus.	<i>Spiritus Raphani compositus.</i>
Spiritus Pimentæ.	<i>Spiritus Pimento.</i>
Succus spissatus Conii.	<i>Succus spissatus Cicutæ.</i>
Sulphur lotum.	<i>Sulphur sublimatum lotum.</i>
Syrupus papaveris Rhæadis.	<i>Syrupus papaveris erratici.</i>
Syrupus papaveris somniferi.	<i>Syrupus papaveris albi.</i>
Tinctura Camphoræ.	<i>Spiritus Camphoratus.</i>
Tinctura Colombæ.	<i>Tinctura Colombo.</i>
Tincturæ Sennæ composita.	<i>Tinctura Sennæ.</i>
Unguentum Acidi Nitrici.	<i>Unguentum Acidi Nitrosi.</i>
Unguentum Calaminæ.	<i>Unguentum Calaminaris.</i>
Unguentum Cetacei.	<i>Unguentum Spermatidis Ceti.</i>

- Unguentum Hydrargyri Oxydi Nitrici *Unguentum subnitratis Hydrargyri.*
 Unguentum Hydrargyri Nitratis *Unguentum Supernitratis Hydrargyri.*
 vel Unguentum Citrinum.
 Unguentum Plumbi Carbonatis. *Unguentum Cerussæ.*
 Unguentum Cupri Subacetatis. *Unguentum Æruginis.*

INDEX A.

OF

CHANGED NAMES.

CHANGED NAMES

OF THE

London Pharmacopœia, 1824.

Acidum Aceticum dilutum.
Adeps præparata.
Æther rectificatus.
Æther Sulphuricus.
Alumen exsiccatum.
Ammoniæ subcarbonas.
Antimonii Sulphuretum præcipitatum.
Antimonium Tartarizatum.
Aqua Menthæ piperitæ.
Argenti Nitras.
Arsenicum album sublimatum.
Calamina præparata.
Cataplasma Fermenti.
Ceratum Calaminæ.

NEW NAMES

OF THE

Dublin Pharmacopœia, 1826.

Acetum distillatum.
Adeps suillus præparatus.
Æther Sulphuricus.
Liquor æthereus Sulphuricus.
Alumen siccatum.
Ammoniæ Carbonas.
Sulphur antimoniatum fuscum.
Antimonii et Potassæ Tartras sive Tartarum Emeticum.
Aqua Menthæ piperitidis.
Argenti Nitras fusum.
Arsenici Oxydum sublimatum.
Zinci Carbonas impurum præparatum.
Cataplasma Fermenti Cerevisiæ.
Unguentum Calaminæ.

<i>Ceratum Cantharidis.</i>	Unguentum Cantharidis.
<i>Ceratum Cetacei.</i>	Unguentum Cetacei.
<i>Ceratum Plumbi Acetatis.</i>	Unguentum Plumbi Acetatis.
<i>Ceratum Resinæ.</i>	Unguentum Resinæ albæ.
<i>Ceratum Sabinæ.</i>	Unguentum Sabinæ.
<i>Ceratum Saponis.</i>	Emplastrum Saponis compositum vel adhærens.
<i>Confectio Rosæ Gallicæ.</i>	Conserva Rosæ.
<i>Confectio Scammoneæ.</i>	Electuarium Scammonii.
<i>Confectio Sennæ.</i>	Electuarium Sennæ.
<i>Decoctum Lichenis.</i>	Decoctum Lichenis Islandici.
<i>Emplastrum Cerae.</i>	Unguentum Cerae flavæ.
<i>Emplastrum Galbani compositum.</i>	Emplastrum Galbani.
<i>Emplastrum Plumbi.</i>	Emplastrum Lithargyri.
<i>Emplastrum Resinæ.</i>	Emplastrum Lithargyri cum Resinâ.
<i>Extractum Aconiti.</i>	Succus spissatus Aconiti.
<i>Extractum Anthemidis.</i>	Extractum Chamæmeli.
<i>Extractum Belladonnæ.</i>	Succus Spissatus Belladonnæ.
<i>Extractum Conii.</i>	Succus Spissatus Conii.
<i>Extractum Hyoscyami.</i>	Succus Spissatus Hyoscyami.
<i>Ferri Subcarbonas.</i>	Ferri Carbonas.
<i>Ferrum Tartarizatum.</i>	Tartarum Ferri.
<i>Hydrargyri Nitrico-Oxydum.</i>	Hydrargyri Oxydum Nitricum.
<i>Hydrargyri Oxymurias.</i>	Hydrargyri Murias corrosivum.
<i>Hydrargyri Submurias.</i>	Calomelas sublimatum.
<i>Hydrargyrum præcipitatum album.</i>	Hydrargyri Submurias Ammoni- atum.
<i>Infusum Anthemidis.</i>	Infusum Chamæmeli.
<i>Infusum Calumbæ.</i>	Infusum Colombæ.
<i>Infusum Cuspariæ.</i>	Infusum Angusturæ.
<i>Infusum Rosæ compositum.</i>	Infusum Rosæ acidum.
<i>Linimentum Camphoræ.</i>	Oleum Camphoratum.
<i>Linimentum Saponis compositum.</i>	Linimentum Saponis.

<i>Liquor Ammoniae.</i>	Ammoniae Causticae Aqua.
<i>Liquor Ammoniae Acetatis.</i>	Ammoniae Acetatis Aqua.
<i>Liquor Ammoniae Subcarbona-</i> <i>tis.</i>	Ammoniae Carbonatis Aqua.
<i>Liquor Calcis.</i>	Calcis Aqua.
<i>Liquor Calcis Muriatis.</i>	Calcis Muriatis Aqua.
<i>Liquor Cupri Ammoniati.</i>	Cupri Ammoniati Aqua.
<i>Liquor Plumbi Subacetatis di-</i> <i>lutus.</i>	Plumbi Subacetatis liquor com- positus.
<i>Liquor Potassae.</i>	Potassae causticae aqua.
<i>Liquor Potassae Subcarbonatis.</i>	Potassae Carbonatis aqua.
<i>Magnesiae Subcarbonas.</i>	Magnesiae Carbonas.
<i>Mucilago Acaciae.</i>	Mucilago Gummi Arabici.
<i>Oleum Aethereum.</i>	Liquor aethereus oleosus.
<i>Oleum Menthæ piperitæ.</i>	Oleum Menthæ piperitidis.
<i>Oxymel simplex.</i>	Oxymel.
<i>Pilulæ Cambogiæ compositæ.</i>	Pilulæ Gambogiæ compositæ.
<i>Pilulæ Hydrargyri Submuri-</i> <i>tis compositæ.</i>	Pilulæ Calomelanos compositæ.
<i>Potassa fusa.</i>	Potassa caustica.
<i>Potassa cum Calce.</i>	Potassa caustica cum Calce.
<i>Potassæ Carbonas.</i>	Potassæ Bicarbonas.
<i>Potassæ Subcarbonas.</i>	Potassæ Carbonas.
<i>Potassæ Supersulphas.</i>	Potassæ Bisulphas.
<i>Pulvis Scammonæ compositus.</i>	Pulvis Scammonii compositus.
<i>Sevum præparatum.</i>	Adeps ovillus præparatus.
<i>Soda tartarizata.</i>	Sodæ et Potassæ Tartras.
<i>Sodæ Carbonas.</i>	Sodæ Bicarbonas.
<i>Sodæ Subcarbonas.</i>	Sodæ Carbonas.
<i>Sodæ Subcarbonas exsiccata.</i>	Sodæ Carbonas siccatum.
<i>Spiritus Aetheris nitrici.</i>	Spiritus Aethereus Nitrosus.
<i>Spiritus Camphoratus.</i>	Tinctura Camphoræ.
<i>Spiritus Myristicæ.</i>	Spiritus Nucis Moschatae.
<i>Syrupus Aurantiorum.</i>	Syrupus Aurantii.
<i>Syrupus Limonum.</i>	Syrupus Limonis.
<i>Syrupus Papaveris.</i>	Syrupus Papaveris somniferi.
<i>Syrupus Rhæados.</i>	Syrupus Papaveris Rhœadis.

- | | |
|-------------------------------------|------------------------------------|
| <i>Tinctura Benzoini composita.</i> | <i>Tinctura Benzoës composita.</i> |
| <i>Tinctura Calumbæ.</i> | <i>Tinctura Colombæ.</i> |
| <i>Tinctura Castorei.</i> | <i>Tinctura Castorei Rossici.</i> |
| <i>Vinum Antimonii Tartarizati.</i> | <i>Liquor Tartari Emetici.</i> |
| <i>Unguentum Hydrargyri for-</i> | <i>Unguentum Hydrargyri.</i> |
| <i>tius.</i> | |
| <i>Unguentum Hydrargyri Ni-</i> | <i>Unguentum citrinum.</i> |
| <i>tratis.</i> | |
| <i>Unguentum Hydrargyri Ni-</i> | <i>Unguentum Hydrargyri Oxydi</i> |
| <i>trico-Oxydi.</i> | <i>Nitrici.</i> |
| <i>Unguentum Hydrargyri præ-</i> | <i>Unguentum Hydrargyri Submu-</i> |
| <i>cipitati albi.</i> | <i>riatis Ammoniati.</i> |
| <i>Unguentum Zinci.</i> | <i>Unguentum Zinci Oxydi.</i> |

INDEX B.

OF

CHANGED NAMES.

NEW NAMES.

OF THE

Dublin Pharmacopœia, 1826.

CHANGED NAMES

OF THE

London Pharmacopœia, 1824.

Acetum distillatum.	<i>Acidum Aceticum dilutum.</i>
Adeps suillus præparatus.	<i>Adeps præparata.</i>
Adeps ovillus præparatus.	<i>Sevum præparatum.</i>
Æther Sulphuricus.	<i>Æther rectificatus.</i>
Alumen siccatum.	<i>Alumen exsiccatum.</i>
Ammoniæ Acetatis Aqua.	<i>Liquor Ammoniæ Acetatis.</i>
Ammoniæ Carbonas.	<i>Ammoniæ Subcarbonas.</i>
Ammoniæ Carbonatis aqua.	<i>Liquor Ammoniæ Subcarbonatis.</i>
Ammoniæ causticæ aqua.	<i>Liquor Ammoniæ.</i>
Antimonii et Potassæ Tartras.	<i>Antimonium Tartarizatum.</i>
Aqua Calcis.	<i>Liquor Calcis.</i>
Aqua Calcis Muriatis.	<i>Liquor Calcis Muriatis.</i>
Aqua Carbonatis Ammoniæ.	<i>Liquor Ammoniæ Subcarbonatis.</i>
Aqua Menthæ piperitidis.	<i>Aqua Menthæ piperitæ.</i>
Aqua Potassæ Carbonatis.	<i>Liquor Potassæ Subcarbonatis.</i>
Aqua Potassæ Causticæ.	<i>Liquor Potassæ.</i>
Argenti Nitras fusum.	<i>Argenti Nitras.</i>
Arsenici Oxydum Sublimatum.	<i>Arsenicum album sublimatum.</i>

Bicarbonas Potassæ.	<i>Potassæ Carbonas.</i>
Bicarbonas Sodæ.	<i>Sodæ Carbonas.</i>
Bisulphas Potassæ.	<i>Potassæ Supersulphas.</i>
Calcis Aqua.	<i>Liquor Calcis.</i>
Calcis Muriatis Aqua.	<i>Liquor Calcis Muriatis.</i>
Calomelas Sublimatum.	<i>Hydrargyri Submurias.</i>
Carbonas Ammoniaë.	<i>Ammoniaë Subcarbonas.</i>
Carbonas Ferri.	<i>Ferri Subcarbonas.</i>
Carbonas Magnesiæ.	<i>Magnesiæ Subcarbonas.</i>
Carbonas Potassæ e lixivo ci- nere.	<i>Potassæ Subcarbonas.</i>
Carbonas Sodæ.	<i>Sodæ Subcarbonas.</i>
Carbonas Sodæ siccatum.	<i>Sodæ Subcarbonas exsiccata.</i>
Carbonas Zincî impurum præ- paratum.	<i>Calamina præparata.</i>
Cataplasma Fermenti Cerevisiæ.	<i>Cataplasma Fermenti.</i>
Conserva Rosæ.	<i>Confectio Rosæ caninæ.</i>
Conserva Rutæ.	<i>Confectio Rutæ.</i>
Cupri Ammoniati Aqua.	<i>Liquor Cupri Ammoniati.</i>
Decoctum Lichenis Islandici.	<i>Decoctum Lichenis.</i>
Electuarium Cassiæ.	<i>Confectio Cassiæ.</i>
Electuarium Scammonii.	<i>Confectio Scammonæ.</i>
Electuarium Sennæ.	<i>Confectio Sennæ.</i>
Emplastrum Galbani.	<i>Emplastrum Galbani composi- tum.</i>
Emplastrum Lithargyri.	<i>Emplastrum Plumbi.</i>
Emplastrum Lithargyri cum Re- sinâ.	<i>Emplastrum Resinæ.</i>
Emplastrum Saponis composi- tum.	<i>Ceratum Saponis.</i>
Extractum Chamæmeli.	<i>Extractum Anthemidis.</i>
Extractum Colocynthisidis sim- plex.	<i>Extractum Colocynthisidis.</i>
Ferri Carbonas.	<i>Ferri Subcarbonas.</i>
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Infusum Colombæ.	<i>Infusum Calumbæ.</i>
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Liquor Plumbi Subacetatis com- positus.	<i>Liquor Plumbi Subacetatis di- lutus.</i>
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Muriatis Ferri liquor.	<i>Tinctura Muriatis Ferri.</i>
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Potassæ Carbonas e Tartari Crystallis.	<i>Potassæ Subcarbonas.</i>
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Potassa Caustica.	<i>Potassa fusa.</i>
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Sodæ Carbonas.	<i>Sodæ Subcarbonas.</i>
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<i>Acidum aceticum scilliticum.</i>	<i>Acetum Scillæ.</i>
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<i>Emplastrum Oxydi Ferri rubri.</i>	<i>Emplastrum Thuris.</i>
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<i>Spiritus Myristicæ moschata.</i>	<i>Spiritus nucis moschata.</i>
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<i>Subcarbonas Potassæ purissimus.</i>	<i>Potassæ Carbonas e Tartari Crystallis.</i>
<i>Subcarbonas Sodæ.</i>	<i>Sodæ Carbonas.</i>
<i>Submurias Hydrargyri mitis.</i>	<i>Calomelas sublimatum.</i>

<i>Submuriās Hydrargyri præci-</i>	Calomelas præcipitatum.
<i>pitatus.</i>	
<i>Subsulphas Hydrargyri flavus.</i>	Oxydum Hydrargyri Sulphu- ricum.
<i>Succus Spissatus Atropæ Bel-</i>	Succus spissatus Belladonnæ.
<i>ladonnæ.</i>	
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<i>pitatum.</i>	
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<i>Syrupus Citri Aurantii.</i>	Syrupus Aurantii.
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<i>Tinctura Aloës et Myrrhæ.</i>	Tinctura Aloës composita.
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<i>Tinctura Aristolochiæ Ser-</i>	Tinctura Serpentariæ.
<i>pentariæ.</i>	
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<i>liatæ.</i>	
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<i>Tinctura Convolvuli Jalapæ.</i>	Tinctura Jalapæ.
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<i>Tinctura Muriatis Ferri.</i>	Ferri Muriatis liquor.
<i>Tinctura Saponis camphorata.</i>	Linimentum Saponis.
<i>Tinctura Saponis et Opii.</i>	Linimentum Anodynum.
<i>Tinctura Thebaica.</i>	Tinctura Opii.
<i>Tinctura Toluiferæ Balsami.</i>	Tinctura Balsami Tolutani.
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<i>Unguentum Infusi Canthari-</i>	Unguentum Cantharidis.
<i>dis Vesicatoriæ.</i>	

- Unguentum Oxidi Hydrargyri rubri.* *Unguentum Hydrargyri Oxydi nitrici.*
Unguentum Oxidi Zinci impuri. *Unguentum Calaminæ.*
Unguentum resinosum. *Unguentum Resinæ albæ.*
Vinum Tartratis Antimonii. *Liquor Tartari emetici.*

INDEX B.

OF

CHANGED NAMES.

NEW NAMES
OF THE
Dublin Pharmacopœia, 1826.

Acetum Vini.
Acetum distillatum.
Acetum Scillæ.
Acidum aceticum.
Acidum nitricum dilutum.
Alumen siccatum.
Ammoniæ Carbonas.
Ammoniæ Carbonatis aqua.

Ammoniæ causticæ aqua.
Antimonii et Potassæ Tartras.
Aqua Carbonatis Sodæ acidula.
Aqua Cinnamomi.
Aqua Pimentæ.
Barytæ Muriatis aqua.
Calcis aqua.
Calcis Muriatis Aqua.

CHANGED NAMES
OF THE
Edinburgh Pharmacopœia, 1817.

Acetum.
Acidum aceticum tenue.
Acidum aceticum Scilliticum.
Acidum aceticum forte.
Acidum nitrosum dilutum.
Alumen exsiccatum.
Subcarbonas Ammoniæ.
Solutio Subcarbonatis Ammonia.

Aqua Ammoniæ.
Tartras Antimonii.
Aqua supercarbonatis Sodæ.
Aqua Lauri Cinnamomi.
Aqua Myrti Pimentæ.
Solutio Muriatis Barytæ.
Solutio Calcis.
Solutio Muriatis Calcis.

Calomelas præcipitatum.	<i>Submurias Hydrargyri præci- pitatus.</i>
Calomelas sublimatum.	<i>Submurias Hydrargyri mitis.</i>
Creta præparata.	<i>Carbonas Calcis præparatus.</i>
Cuprum Ammoniatum.	<i>Ammoniaretum Cupri.</i>
Decoctum Senegæ.	<i>Decoctum Polygalæ Senegæ.</i>
Electuarium Sennæ.	<i>Electuarium Sennæ compositum.</i>
Emplastrum Galbani.	<i>Emplastrum gummosum.</i>
Emplastrum Lithargyri.	<i>Emplastrum adhæsivum.</i>
Emplastrum Thuris.	<i>Emplastrum Oxydi Ferri rubri.</i>
Extractum Chamæmeli.	<i>Extractum Anthemidis nobilis.</i>
Extractum Jalapæ.	<i>Extractum Convolvuli Jalapæ.</i>
Ferri Carbonas.	<i>Carbonas Ferri præcipitatus.</i>
Ferri Muriatis liquor.	<i>Tinctura Muriatis Ferri.</i>
Ferri Oxydum nigrum.	<i>Oxidum Ferri nigrum purifi- catum.</i>
Ferri Rubigo.	<i>Subcarbonas Ferri præparatus.</i>
Ferri Tartarum.	<i>Tartras Potasse et Ferri.</i>
Infusum Lini compositum.	<i>Infusum Lini usitatissimi.</i>
Infusum Sennæ cum Tamarin- dis.	<i>Infusum Sennæ compositum.</i>
Linimentum Ammoniæ.	<i>Oleum Ammoniatum.</i>
Linimentum Anodynum.	<i>Tinctura Saponis et Opii.</i>
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Linimentum Saponis.	<i>Tinctura Saponis Camphorata.</i>
Liquor Arsenicalis.	<i>Solutio Arsenicalis.</i>
Liquor Tartari emetici.	<i>Vinum Tartratis Antimonii.</i>
Mel Boracis.	<i>Mel Sub-Boratis Sodæ.</i>
Mistura Cretæ.	<i>Potio Carbonatis Calcis.</i>
Mucilago Gummi Arabici.	<i>Mucilago Acaciæ Arabicæ.</i>
Mucilago Gummi Tragacanthæ.	<i>Mucilago Astragali Tragacan- thæ.</i>
Nitras Argenti fusum.	<i>Nitras Argenti.</i>
Oleum Anisi.	<i>Oleum Pimpinellæ Anisi.</i>
Oleum Pimentæ.	<i>Oleum Myrti Pimentæ.</i>
Oleum Sabinæ.	<i>Oleum Juniperi Sabinæ.</i>

<i>Oleum Sassafras.</i>	<i>Oleum Lauri Sassafras.</i>
<i>Oleum Succini rectificatum.</i>	<i>Oleum Succini purissimum.</i>
<i>Oleum Terebinthinæ rectificatum.</i>	<i>Oleum volatile Pini purissimum.</i>
<i>Oxydum Hydrargyri Sulphuricum.</i>	<i>Subsulphas Hydrargyri flavus.</i>
<i>Pilulæ Aloës cum Myrrhâ.</i>	<i>Pilulæ Aloës et Myrrhæ.</i>
<i>Pilulæ Calomelanos compositæ.</i>	<i>Pilulæ Submuriatis Hydrargyri compositæ.</i>
<i>Pilulæ Scillae compositæ.</i>	<i>Pilulæ Scilliticæ.</i>
<i>Potassæ Bicarbonas.</i>	<i>Carbonas Potassæ.</i>
<i>Potassæ Carbonas e lixivo cinere.</i>	<i>Subcarbonas Potassæ.</i>
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<i>Sodæ Carbonas.</i>	<i>Subcarbonas Sodæ.</i>
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<i>Spiritus Carui.</i>	<i>Spiritus Cari Carui.</i>
<i>Spiritus Cinnamomi.</i>	<i>Spiritus Lauri Cinnamomi.</i>
<i>Spiritus Nucis Moschatae.</i>	<i>Spiritus Myristicæ Moschatae.</i>
<i>Spiritus Pimentæ.</i>	<i>Spiritus Myrti Pimentæ.</i>
<i>Succus Spissatus Belladonnæ.</i>	<i>Succus Spissatus Atropæ Belladonnæ.</i>
<i>Sulphur Antimoniatum fuscum.</i>	<i>Sulphuretum Antimonii præcipitatum.</i>
<i>Sulphur lotum.</i>	<i>Sulphur Sublimatum lotum.</i>
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<i>Syrupus Balsami Tolutani.</i>	<i>Syrupus Toluiferæ Balsami.</i>
<i>Syrupus Limonis.</i>	<i>Syrupus Citri medicæ.</i>

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|---------------------------------------|--|
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| Tinctura Aloës composita. | <i>Tinctura Aloës et Myrrhæ.</i> |
| Tinctura Angusturæ. | <i>Tinctura Bonplandiæ trifoli-</i>
<i>atæ.</i> |
| Tinctura Assæfoetidæ. | <i>Tinctura Ferulæ Assæfætidæ.</i> |
| Tinctura Balsami Tolutani. | <i>Tinctura Toluiferæ Balsami.</i> |
| Tinctura Cascarillæ. | <i>Tinctura Crotonis Eleutheriæ.</i> |
| Tinctura Castorei Rossici. | <i>Tinctura Castorei.</i> |
| Tinctura Catechu. | <i>Tinctura Acaciæ Catechu.</i> |
| Tinctura Cinnamomi. | <i>Tinctura Lauri Cinnamomi.</i> |
| Tinctura Jalapæ. | <i>Tinctura Convolvuli Jalapæ.</i> |
| Tinctura Opii. | <i>Tinctura Thebaica.</i> |
| Tinctura Opii Camphorata. | <i>Elixir Paregoricum Anglorum.</i> |
| Tinctura Serpentariæ. | <i>Tinctura Aristolochiæ Serpen-</i>
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| Unguentum Hydrargyri oxydi
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